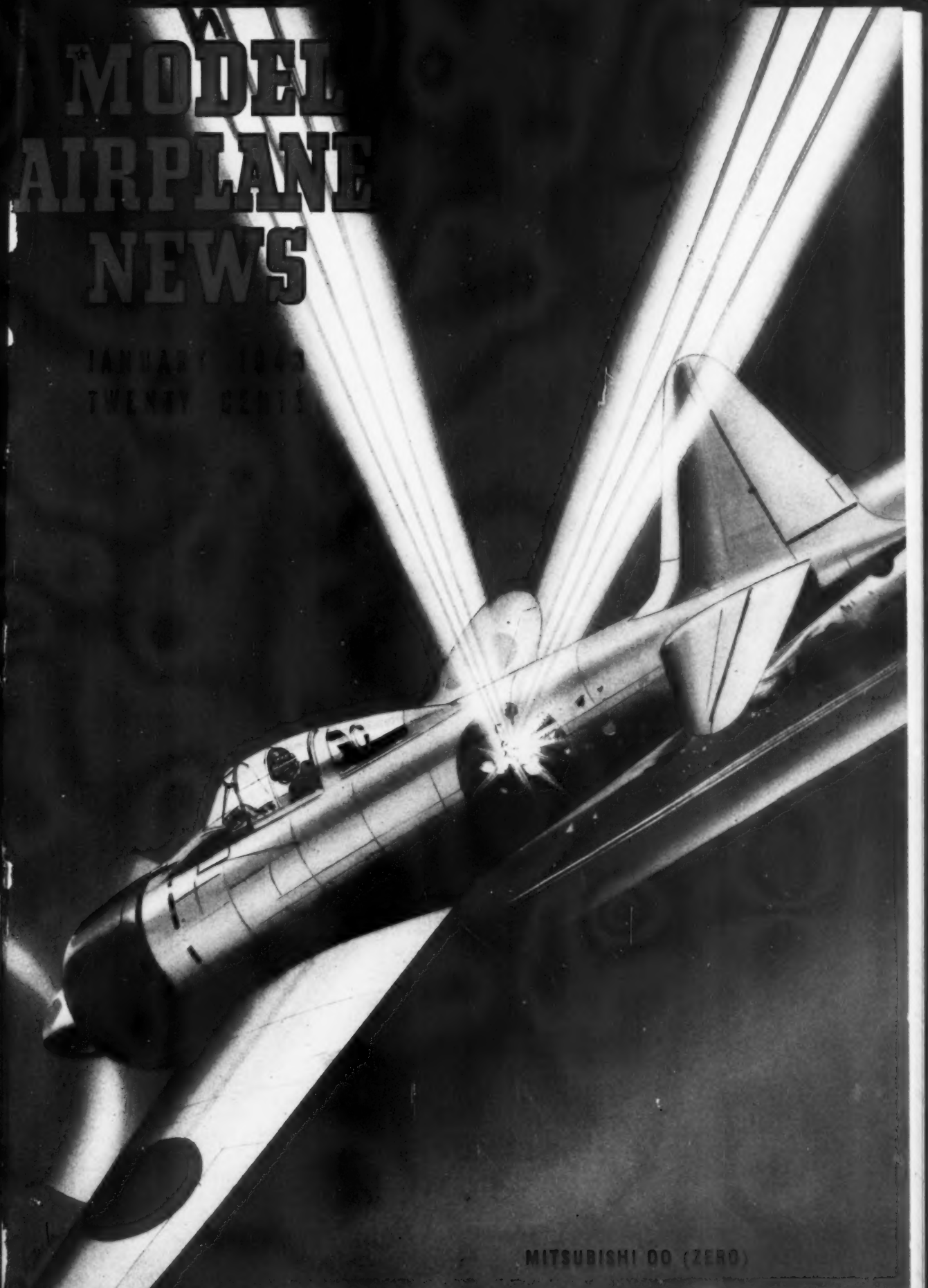
MODEL AIRPLANE NEWS



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FLASH NEWS

BIGGEST news of the war is the opening of the second front, so anxiously awaited by the free-thinking mankind of Earth. The occupation of strategic cities in Morocco and Algeria by American troops heralds the active participation in this war on a large scale of the strength of America's fighting power and brings to bear on Hitler and his treacherous cohorts the full-fledged big guns of the United Nations, now all-out for victory.

No less heartening has been the joyous news of the victorious British 8th Army in its relentless pursuit of General Rommel's fleeing Afrika Corps. With the landing of American troops, supplies and equipment in Algiers, Oran and Casablanca, the way is now clear for the Yanks to catch Rommel's shattered troops between two fires and quickly annihilate the remnants of his once-powerful forces which, for a brief time, seriously threatened the Suez Canal, the middle-East, and an effective sealing of Europe away from its Allies.

In command of the American Army Air Forces in the Mediterranean theater of operations is General Jimmy Doolittle, speed flier, record-breaker and bomber of Tokio. The Curtiss and Bell fighters and Douglas and Martin light bombers now in action are attacking the enemy as a part of an American army fighting an American offensive, for the first time in this, the second World War.

Out of the muddle production situation that is Washington has come, at last, a supreme, direct control over the giant American aircraft industry. Mr. Charles E. Wilson, formerly president of General Electric, has been appointed "czar" of the design, production and procurement of aircraft including the allotment of raw materials. This move will in many ways consolidate and solidify the huge effort being put forth by the world's largest aircraft industry. To win an airwar requires airplanes, and to build airplanes requires men, machines and materials. These are now assured.

With the success of the torpedo plane as an aerial weapon against war vessels, the Royal Air Force has converted large numbers of Handley-Page Hampden bombers (MODEL AIRPLANE NEWS, June 1941 issue) into torpedo carriers and, as such, have achieved success in the North Atlantic serving with the Coastal Command. Having been replaced in front line action by later and faster medium bombers, the Hampden has been carrying on as mine-layers and cooperation planes but in this new field it would appear that an entirely new career was open to these fast, three-man, heavily armed planes.

Brig. General Claire Chennault, formerly leader of the far-famed Flying Tigers in China, has directed the first American raid on Hongkong, blasting the great Kowloon dock area of the British crown colony into a pile of debris. Now commander of the American air forces in the Far East, Chennault also claimed that his men downed ten enemy planes during the foray and damaged five others. The combined operations were commanded by Brig. General Caleb V. Haynes, who led the bombers, and Colonel Report L. Scott, who now commands the old Tiger group, led the fighters. "We have much more in store for the Japs," Chennault announced, beaming upon the success of the raid.

Marine Corps aviation now has a second base, the beautiful new airfield and training center near Santa Ana, California. The site is the area in which the six Russian fliers landed after their record-breaking non-stop flight from Moscow in 1936. It is now in the process of being leveled and hangars, barracks, repair shops, and depot are rapidly nearing completion.

One of aviation's most historic controversies has at last been settled with the recent revelation of information held secret for nearly thirty years. For this length of time a great deal of doubt has existed over just who should be accorded the rightful honor of inventor of the airplane. The Wright brothers actually were the first to fly in a powered machine but only a few weeks previously Professor Samuel Pierpont Langley had achieved near-success with his "aerodrome" which was damaged on its takeoff on the Potomac river houseboat he used for a launching platform. Nearly 10 years later, Glenn Curtiss took the original Langley machine aloft on a successful flight, thereby insisting that the Langley machine was the first airplane "capable" of sustained flight irrespective of the fact that the Wright Brothers machine was the first to actually go aloft. The contention of the Langley supporters was that Curtiss had soared aloft in the original Langley machine with the latter almost completely unaltered. However, now comes forward Dr. Charles G. Abbot, present secretary of the Smithsonian Institution, to state that after an investigation of some 15 years he is prepared to state that the Langley machine did not sustain flight with Glenn Curtiss at the controls until numerous extensive modifications were made on it in the Spring of 1914 by the ingenious aviator. As a result of the original controversy, a court ruling permitted Langley to retain his patents and, in protest, the Wright Brothers shipped their original flying machine off to the London Museum where it now rests. Orville Wright, still hale and hearty in Dayton, Ohio, has accepted the Institution's explanation of the misunderstanding and has given permission for the priceless machine to be returned to this country after an absence of nearly three decades, to be placed in the Smithsonian Museum rightfully labeled: "The first airplane in the world capable of flight."

Loss of many valuable weeks before construction on new planes can be started will

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14TH YEAR OF PUBLICATION

MODEL AIRPLANE NEWS

JANUARY, 1943 VOL. XXVIII, No. 1

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Charles Hampson Grant

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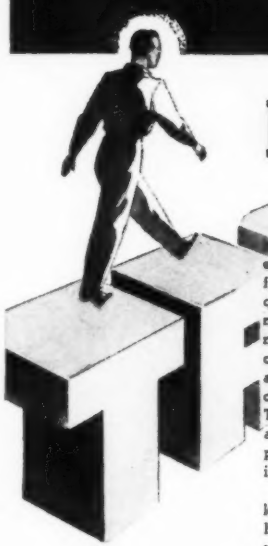

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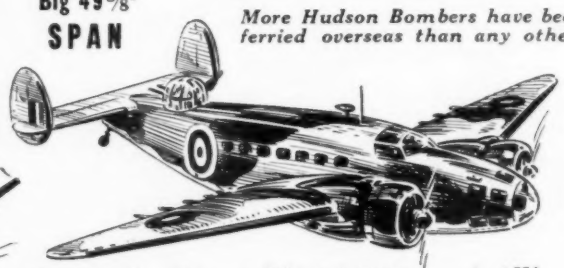

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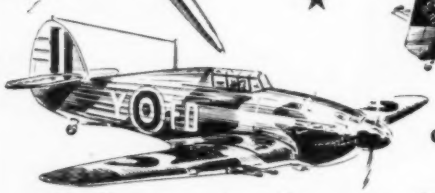

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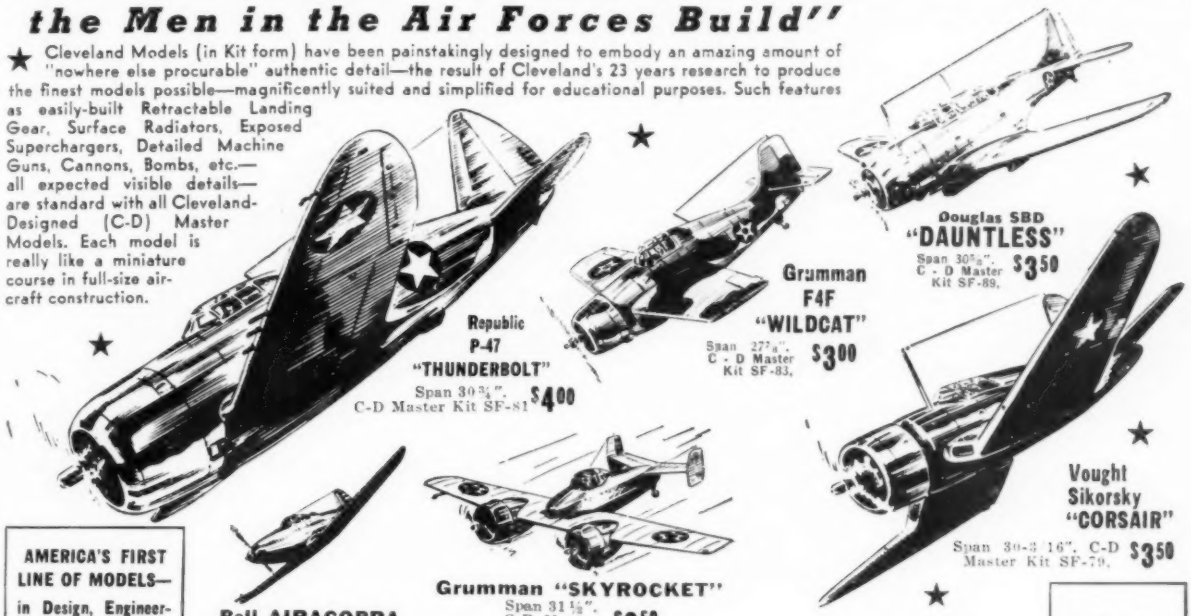

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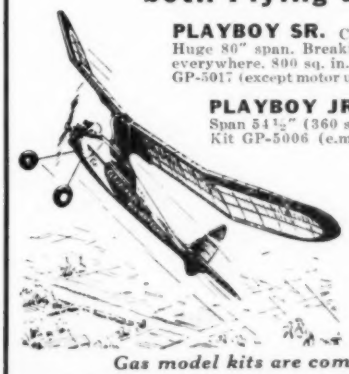

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MODELS

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AIR POWER TRIUMPHANT!

What our planes are doing to win the war and demonstrate their superiority in all phases of combat

by ROBERT McLARREN

THE United States is rounding out its first year of active participation on a genuine offensive basis in this second World War. Most assuredly we were in this war from the very start on September 3rd, 1939, and American-made materials of warfare were in use three years ago on the world's battlefronts; but not until Pearl Harbor, December 7th, 1941, did American troops and equipment, men and machines engage the enemy—flaunting the red-white-and-blue of the U.S.A.

From Washington has come little but arguments and debates, shortages and priorities, strikes, wage-controversies, complaints and inefficiencies. According to the news from the nation's capitol, we have done nothing but muddle, squabble, and dabble.

But what about the men out on the front lines where politicians are conspicuous by their absence? What about the men of action who are short on words but long on strength, guts and "know-how"? What about the generals who are running the show, the colonels who are carrying out the strategy, the majors and captains who are directing the lieutenants tactically in the dirty work of winning the war—and then going themselves when the going is toughest?

The answer is that in a year of war our U.S. Army Air Forces have performed miracles, have started from scratch, like our production lines, and have done the job as thoroughly and efficiently as any tank arsenal or plane factory now flying a pennant for excellent performance. The Army Air Forces are well under way towards their goal of 2,000,000 men to keep 185,000 planes flying and fighting. They are training thousands upon thousands of pilots, navigators, bombardiers, gunners, and radio operators plus technicians for the ground crews. Literally hundreds of new flying fields and instruction schools are now in full-time operation, putting the Iowa farmer, the New York newsboy, the Texas cowhand and the Maine fisherman through the toughest grind in the world, whipping him into shape, training him to perfection, and placing him on a team to fight the most desperate war in history.

The U.S. Army Air Forces are now flying and fighting throughout the entire world, on every front, in every kind of weather, over every kind of land and ocean, meeting every kind of opposition the enemy can devise. And he is beating the enemy, winning victories over every type of enemy airplane, smashing every type of defense the enemy has constructed.

And the Army Air Forces are using the finest equipment in the entire world to do the job: thank America's production lines for that!

The Army Air Forces Curtiss P-40 has seen the greatest variety of service, has been in action longer and in greater numbers, has shown the brand of aerial warfare the Yank pilot fights. With the British, the P-40 has played a vital role, saved many a day, gained enviable renown as the Tomahawk, Kittyhawk and Warhawk. (See MODEL AIRPLANE NEWS, February 1939, issue and February 1942 issue.)

Playing a new and unsuspected role in the Libyan Desert, Kittyhawks have recently taken a large part in the smashing British counter-offensive which has put the Axis drive on Alexandria and the vital Suez Canal in reverse. The Kittyhawks, equipped with bomb-racks, have become "Kittybombers" and, as such, are being used against both Nazi tanks and mechanized ground equipment and against fighters and bombers of the Luftwaffe in Africa with outstanding success. The Kittybomber, according to reports from Egypt, is fast enough to take on any fighter bearing the swastika, even with bombs in the racks. And their swift and deadly dive-bombing attacks, in which the pilots use their fixed gunsights as bombsights, have seriously interrupted many a line of mechanized infantry and supply transports.

In one of their first forays as fighter-bombers, a formation of Kittyhawks flown by Australian pilots was attacked by a formation of ten Messerschmitts. The

Top Lockheed P-38 interceptor, one of the fastest military planes in the world. *Left* Three Republic P-47 Thunderbolts on the wing—one of the most powerful and deadly pursuits in existence. *Right* The Curtiss P-40D Kittyhawk has proved to be one of the most versatile planes ever produced.

Left North American Aviation Mustang P-51 is a fast low altitude fighter. *Right* Douglas A-20 attack bomber has caused great destruction in African and European raids.

Kittybombers went into a twisting dogfight with their bombs still in the racks, shot down two of the Messerschmitts, drove off the others, and then continued with their bombing attack!

Adding to the score of brilliant actions by P-40 fighters in the Middle East, a British Air Observer at Cairo has reported that on May 18th eight P-40s (Kittyhawks) and four Bristol Beaufighters (MODEL AIRPLANE NEWS, November, 1941 issue) intercepted twenty Junkers Ju-47 transports escorted by three German Messerschmitt Me-110 twin engine fighters. The P-40s accounted for seven of the transport planes and two of the Messerschmitts, driving the rest to cover.

Another report from the Middle East Command covering actions over a certain period by the P-40D Kittyhawks and the P-40 Tomahawks relates that in offensive patrol and bomber escort operations in the Libyan battle area, 690 flights were made by Kittyhawks and 173 by Tomahawks. In addition to attacking motor transport and military targets they destroyed the following German aircraft: 90 on the ground, 9 in the air confirmed, and 2 probably destroyed. In addition, another 10 of the Luftwaffe were severely damaged in the air.

A flight of twelve Tomahawks in the Near East encountered a mixed German and Italian force of more than 60 planes. Fighting at odds of better than 5-to-1, they destroyed 36 of the enemy!

On the Russian front, particularly in the bitter fighting for Leningrad, Tomahawks have also distinguished themselves. The very first Tomahawk was taken aloft by Major Pilyutov who was promptly attacked by six German Heinkel He-113's, the Luftwaffe's fastest fighter. Against these odds, Major Pilyutov downed one Heinkel and drove off the others. Some evidence of what the Russians think of this plane is gained from an official account: "The Tomahawks are making a good showing during the present offensive, too. On April 1st they bagged eight German planes on the Leningrad Front. On April 13th three Tomahawks, under the command of Senior Lieutenant Zelenov, shot down five Italian planes during a single engagement. Since the day when Tomahawks first appeared on the Leningrad Front, five fliers, Pilyutov, Pokryshev, Flotov, Zelenov and Fedorenko, shot down fifty German planes!"

On the Southwest Pacific battle front, the P-40 has established itself as one of the most famous airplanes of all times, flaunting its gaudy "Flying Tiger" makeup and slashing at the Jap fighters under the knowing eye of Brigadier General Claire L. Chennault. Speaking of the highly vaunted Jap Zero fighter, he said: "The new Zeros, of which 15 have been shot down over Hengyang, are far better than the old ones but inferior to our planes and it will take at least two years before the Japs are able to construct anything equaling our newest." Before becoming an official unit of the U.S. Army Air Forces, the American Volunteer Group shot down 299 Japanese airplanes with a loss to themselves of only 24 pilots. Fifteen of these enemy fighters were downed in the two-week period of "grace" given the squadron prior to its induction into the Air Forces.

The Bell P-39 Airacobra has distinguished itself on at least two fronts. A report from Russia states that a squadron of P-39s engaged and destroyed 73 German airplanes with the phenomenally small loss of only two planes. All types of German aircraft are reluctant to close with these fast, deadly, cannon-firing fighters, the report declared.

One battle report from the South Pacific relates that six P-39s flying at 8,000 feet saw eight Jap Zeroes several thousand feet below. The Airacobras dove to the attack and one of them collided with a Zero, wrecking the top half of the rudder, elevator and vertical fin of the Jap ship which disappeared out of control in a steep spiral. The P-39, which took the impact on its left wing, returned safely to its station with only slight damage. On July 6th at Port Moresby, New Guinea, seven Jap Zeros attacked five P-39s. They broke off action rapidly after one Zero had been damaged with no losses to the Airacobras.

There have been many encounters in the Southwest Pacific area between fighters of our forces and the Japanese Zero fighters. Major General George H. Brett states that when our fighter pilots are asked if they would trade their P-39 and P-40 for the Japanese Zero, their answer is definitely and almost unanimously in the negative.

Such a trade would mean giving up the protection of armor, leak-proof gasoline tanks and parachutes, they reply. It must be borne in mind that the P-39 and P-40 are medium-altitude fighters. While they are designed for maximum effectiveness at altitudes of about three miles, they have been defeating enemy fighters and bombers up to a height of five miles, far above the range for which they were intended.

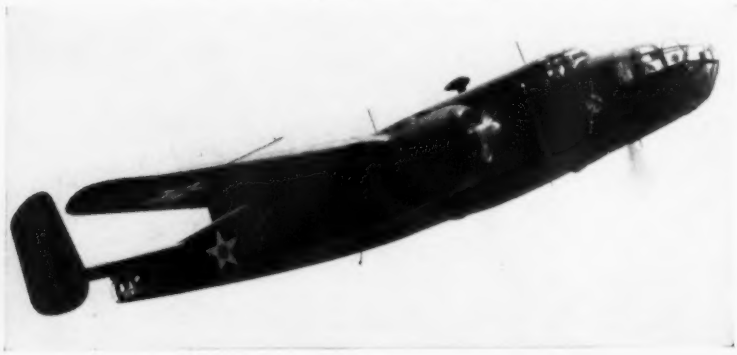
Recently it was officially announced from London by the Royal Air Force that the new North American P-51 Mustang fighter (MODEL AIRPLANE NEWS, September 1941 issue), recently put into combat operation by the Army Cooperation Command, has given a splendid account of itself in action over the invasion coast. Until they are

Left The Bell Airacobra, 400 mph pursuit, is small and deadly, mounting 7 guns including a cannon. *Right* Curtiss P-40 Tomahawks, a predecessor of the P-40D, on the line ready to take off on a raid.

Consolidated B-24 Liberator bomber has made hundreds of devastating long range bombing raids.

The famed Boeing B-17E Flying Fortress, called "Old Indestructible" because it keeps flying regardless of damage.

Martin B-26, fastest bomber in the world, 375 mph, has given invaluable service in the South Pacific. *Below* The North American B-25 medium bomber has long range and large bomb capacity; now in mass production.



needed for close army support the P-51s are being employed as Fighter Command aircraft by the R.A.F.

In one attack, a British pilot flew his Mustang through an enemy radio antenna between two pylons. Another pilot described the sturdiness of the Mustang as "wonderful" and said that some of them "have taken punishment which would have been too much for most fighters."

The Lockheed P-38 (MODEL AIRPLANE NEWS, May 1939 issue), known by the British as the "Lightning," has already engaged the Japanese with notable success. The first battle action for the P-38 twin engine interceptor fighter took place recently in an undisclosed theater. Two P-38's intercepted a K-97 four engine Japanese flyingboat and shot it down in flames. The P-38s later attacked a second ship of the same type and shot it down out of control, presumably to crash.

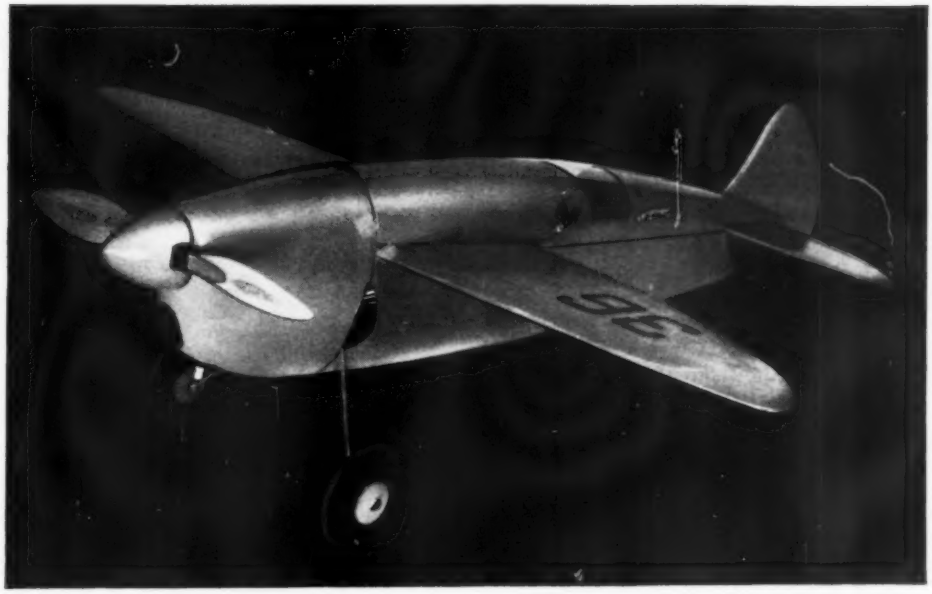
Another Army Air Forces fighter (together with the P-38 one of our high-altitude interceptors), the Republic P-47 Thunderbolt, now is in production and ready for delivery to combat theaters. This plane is regarded as a tremendous package of power and is believed able to outfly and outfight any other known airplane.

It carries enough guns to generate at maximum firing speed an impact equal to the force of a five-ton truck hitting a brick wall at 60 miles per hour. Moreover, it is built not only to give but to take rough treatment, weighing some 11,000 pounds as compared with the 6,500 pounds of ordinary pursuits or fighters, most of the weight being in armor, armament, supercharger and equipment for high-altitude flying. Definitely in the 400-mile-per-hour class, it will be at its fastest between 25,000 and 30,000 feet.

American bombing planes have established themselves as superior to anything thus far shown by the enemy. The Boeing B-17 Flying Fortress (MODEL AIRPLANE NEWS, April 1942 issue) has become one of the most talked-of planes in this war and here are a few typical actions in which B-17s were engaged:

On July 25th at Buna, New Guinea, one B-17 engaged 15 Japanese Zero fighters. The B-17 was slightly damaged. Enemy losses: one Zero shot down and two others listed as "probables."

(Continued on page 31)



PILOT "SPEE-DEE"

A fast, snappy U-Control model that provides all the thrills of piloting a full scale racing plane

by **FRANK EHLING**

THERE are all types of models that one can build, yet there are few that look like a real airplane and still turn in good performance. This model on the wing looks as realistic as one could expect to see. All this is only obtained with the aid of U-control tethered flying, for most of these "little bullets" would really crack up when landing, since they are so fast.

In designing this little ship scale effect has not been lost nor has flying ability, yet it is an easy ship to build and fly. With a simple framework and a few balsa blocks to streamline it, a good strong ship will result. These little racers, unless handled carefully, do not come in to land like an indoor glider but more like a streamlined brick; that is why they have to be built as strong as possible.

The wide range of motors that can be used in this ship will make it a hit with model builders. If your motor does not fit the cowl all that need be done is cut the bottom of the cowl and let the motor extend out the bottom, for the extra power you will get in return will offset the drag of the motor.

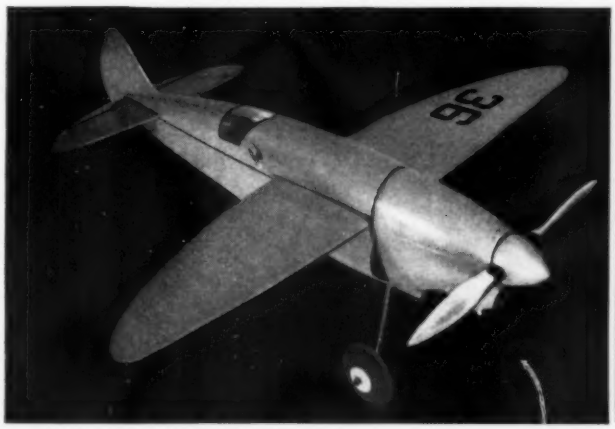
It must be remembered that streamlining takes effect after forty miles per hour and with this in mind a good smooth finish will add speed to your ship, it will also preserve the ship from oil and gas that will rot the balsa. This is one reason that these ships most generally boast a slick paint job.

To start with, the plans of the wing and stabilizer are drawn full size so you will have little trouble. The fuselage will have to be enlarged; this can be done with a pair of dividers. All that you need do is draw a straight line which will represent the thrust line; this will be drawn four times the size shown on the plan. Then start by making the first bulkhead and set the divider at the thrust line and put the other point at the lower part of the fuselage. Then set the divider on the thrust line and mark off four times. This will give you the depth of the front bulkhead. You can go right along down the fuselage in this way and when the bottom is finished, the top can be done next. The same procedure is done to get the top view.

Start by laying down the sides; these are made one atop the other, in this way

(Continued on page 30)

Powerful and highly streamlined, it is very fast but sturdy because of rugged construction



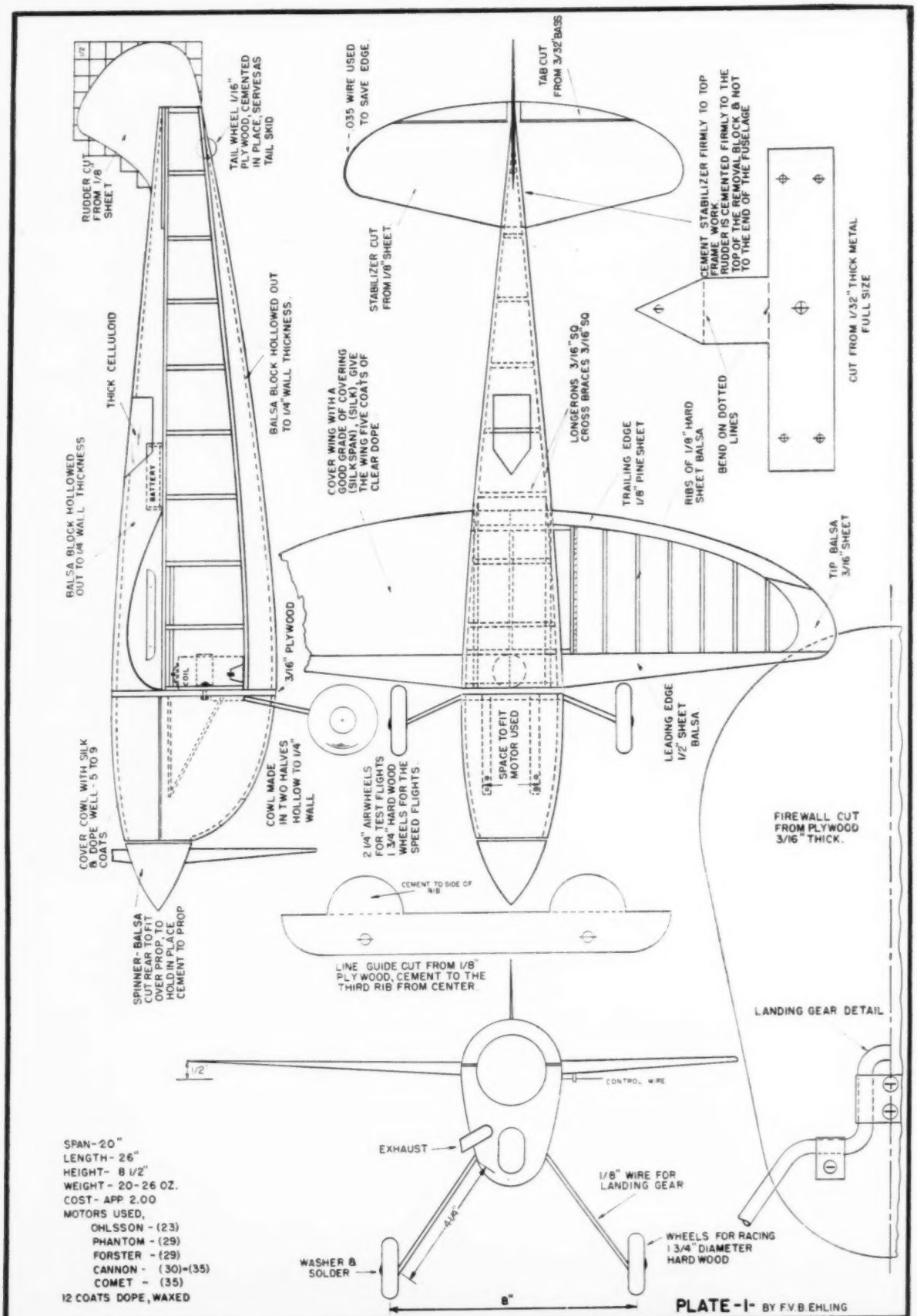
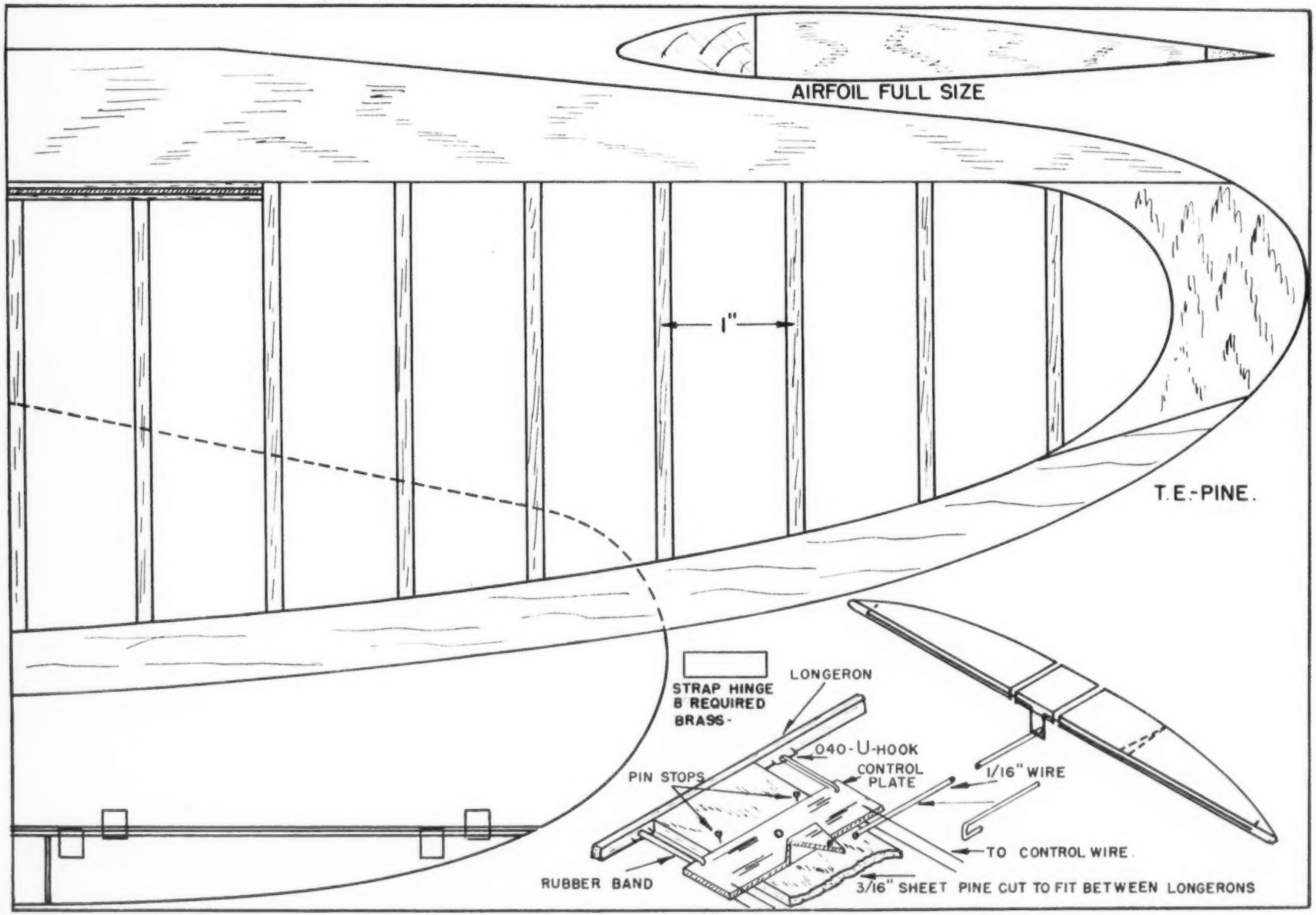


PLATE - I - BY F.V.B. EHLING


AIRFOIL FULL SIZE
1"
T.E.-PINE.
STRAP HINGE
8 REQUIRED
BRASS
LONGERON
.040-U-HOOK
CONTROL
PLATE
PIN STOPS
1/16" WIRE
TO CONTROL WIRE
RUBBER BAND
3/16" SHEET PINE CUT TO FIT BETWEEN LONGERONS

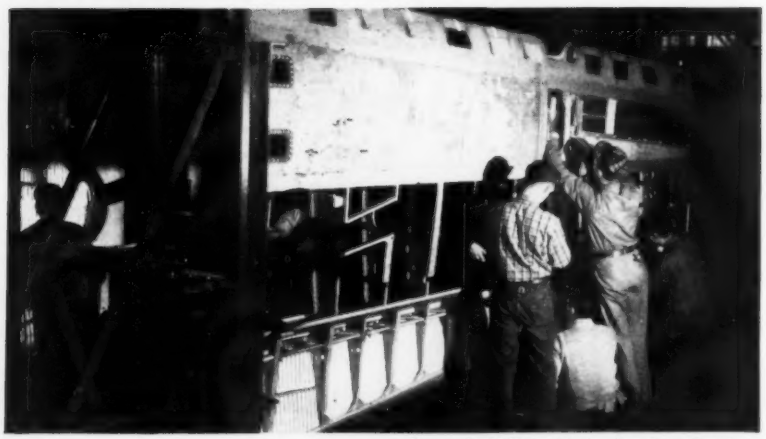
MODELING YOUR FUTURE IN AVIATION

Official Air Youth course in elementary aeronautics

by **CHARLES H. GRANT**

ARTICLE 7.

Typical airplane structures resulting from considerations of weight and drag—How to build a flying scale stressed-skin Thunderbolt glider



THE aerodynamic form and contours of the modern airplane are due almost entirely to the performance required of it, as explained in preceding chapters of these articles. This has not always been so; in early types of twenty or more years ago, form was dictated by structural requirements as well as aerodynamic. For instance, consider old style biplanes with struts and wires between the wings, non-retractable landing gear, and angular contours. The value of streamlining was well known then, so why were planes built with such characteristics?

It was not because of mere fancy: the very vital reason for this seeming negligence was *weight*. The strut and wire, angular type of structure was much lighter and at that time this was important because engines delivered comparatively low power, a mere 150 to 350 hp. compared to the 2,000 hp. of our most modern powerplants. These "midget" motors could "fly" only just so much weight at a speed of not more than 165 to 170 miles per hour. At this speed the drag caused by struts and wires absorbed less power than the greater weight in streamline structures of equal strength without external braces like wires and struts. In other words, at this low speed greater advantage was obtained by light weight than low drag. Consequently, the externally braced airplane was the style. Typical examples are shown in Figs. 56-A and 56-B.

Some experimental planes were built with all braces enclosed within the surfaces of the airplane; that is, they were *internally* braced. But these were heavy, and though they were fast due to low drag, climb was labored because of great weight and low power.

However, with the development of higher

Top **Fig. 60 Ford tri-motor transport 5-D, with internally braced cantilever wing.** *Upper Left* **Fig. 58 Interior of the Curtiss-Wright No. 20 transport showing light internal framework with stressed skin outside covering.** *Left* **Fig. 59 Assembling a wing. Note the internal framework of ribs and spars, covered with a metal skin**

Fig. 56-A Douglas Corrigan's old trans-Atlantic 185 hp. Curtiss Robin with stressed frame, cloth covered

power engines, speeds of externally braced craft were increased to nearly 200 mph. But here it was found that external bracing absorbed a tremendous amount of power because the drag increased as the square of the speed. This means that if the speed is increased from 100 to 200 mph (doubled) the drag increases four times.

So then it became more advantageous to decrease drag than weight. The drag of internally braced planes was so much less than those externally braced, at these higher speeds, that the power saved was far greater than that required to fly the increased weight. Consequently, since the advent of high powered engines and higher speeds the airplane has gone through a process of progressive streamlining. First strut and wires were eliminated and all structural bracing housed within the "skin" of the airplane. Next, retractable landing gear replaced the old fixed type that caused so much drag. This alone increased high speeds 15 per cent. Then engines were carefully cowled to insure smooth airflow around the fuselage. To further reduce drag all corners and angular contours were replaced by smooth curves. To accomplish this, flat sided fuselages were faired by additional structure that gave rounded contours. All of these changes involved greater weight, to be sure, but drag was decreased to such an extent that this was insignificant in effect.

However in the search for lighter structures more adaptable to this super-streamline plane, the "stressed skin" airplane was developed—the modern type shown in Fig. 57. The old type consisted of internal framework covered with cloth, that carried all the stresses. The new stressed skin construction employs light internal framework with a rigid covering that absorbs a greater part of the stresses.

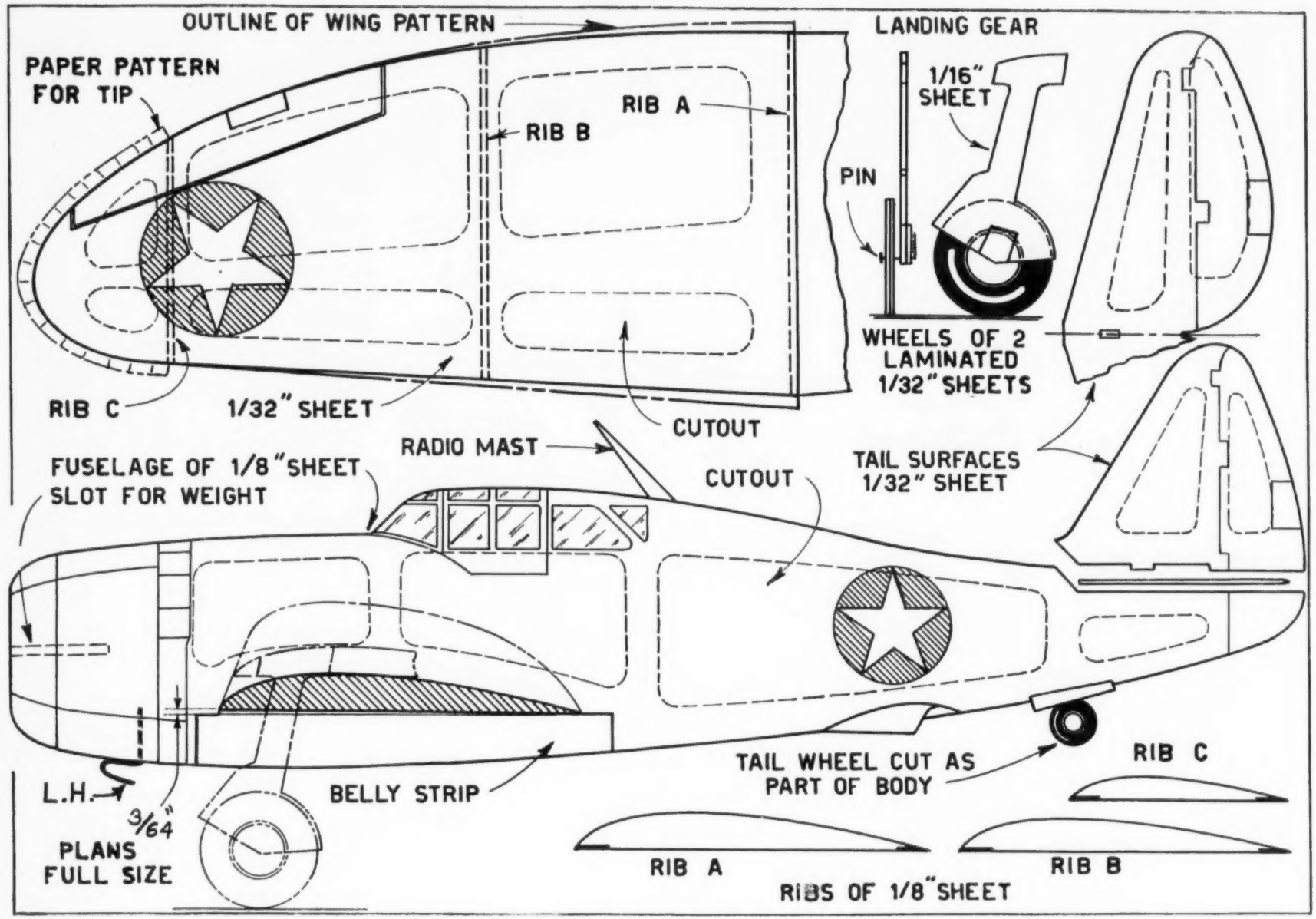
Wood veneer was employed as a covering in earlier models of the latter type. This has been replaced largely by duralumin-um however, an aluminum alloy of great strength and light weight.

This construction makes the forming of curved streamline surfaces comparatively simple and eliminates much of the heavy internal framework (usually of steel tubing) formerly employed.

So today there are two general structural types of planes: those with internal stress-carrying framework covered with cloth, designed for slow speeds and economical operation, and the stressed rigid skin high

Fig 56-B An Old DeHaviland DH-4M-1 braced with struts and wires

Fig. 57 A Vultee attack plane of modern skin-stressed design. *Below* Fig. 61 The Brewster dive bomber has a smooth stressed metal skin with light internal frame


OUTLINE OF WING PATTERN
PAPER PATTERN FOR TIP
RIB A
RIB B
RIB C
1/32" SHEET
CUTOUT
LANDING GEAR
1/16" SHEET
PIN
WHEELS OF 2 LAMINATED 1/32" SHEETS
TAIL SURFACES 1/32" SHEET
RADIO MAST
FUSELAGE OF 1/8" SHEET
SLOT FOR WEIGHT
CUTOUT
L.H.
3/64"
PLANS FULL SIZE
BELLY STRIP
TAIL WHEEL CUT AS PART OF BODY
RIB C
RIB A
RIB B
RIBS OF 1/8" SHEET

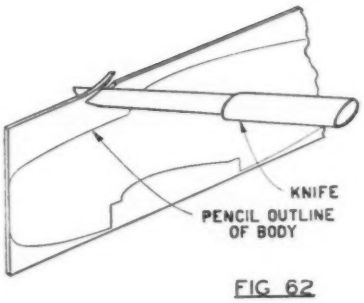


FIG 62

FIG 63

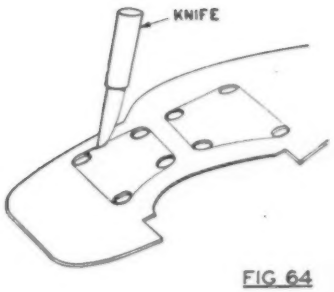


FIG 64

speed type; the latter being of wood, plaster or metal structure, though usually metal.

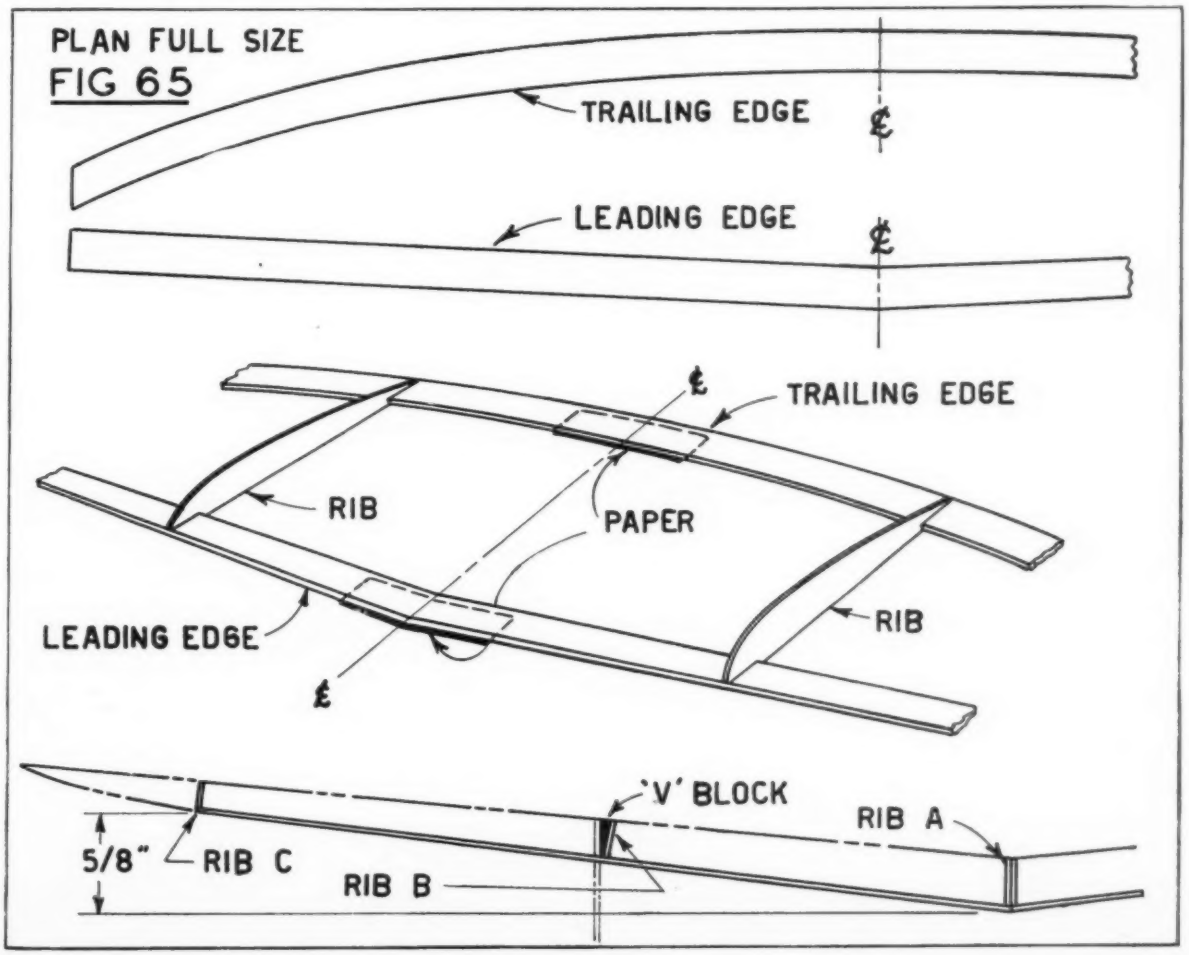
Stressed skin construction is typified by a shell of metal or other material forming the outer surface of the structure and shaped to aerodynamic requirements. This shell carries most of the stress. Within the shell is a framework of light braces designed and located to hold the outer skin in its proper shape under strain and which also carries part of the load.

When considering airplane fuselages, the stress-resisting skin forms the smooth outer surface, as in the airplane in Fig. 57. Fig. 58 shows the inside of a bomber fuselage with the light framework to which the outer skin is securely fastened. In the figure this constitutes a series of light metal rings spaced by numerous stringers running perpendicular to them and flush with their outer edges. The surface skin is riveted to these stringers and rings, the whole forming an exceedingly light yet rigid structure. In effect, it is a light-weight tube.

Wings are constructed in a similar manner; however instead of rings, similar members perpendicular to the wing surface are used to create the proper wing section form. These are called "ribs" and consist of metal sheets or built-up structures, riveted to the outer skin at intervals within the wing, perpendicular to its span. These plates or ribs give the wing its proper crosssection shape. To stiffen the structure spanwise, stringers and spars similar to the fuselage stringers shown in Fig. 58 pass along the span contacting the skin perpendicular to their ribs and flush with their edges. Sometimes large stress carrying wing beams pass through the wing upon which the ribs are mounted. The metal covering is riveted or otherwise fastened to this inner frame structure.

This frame takes many forms. For instance, ribs may be built up of many members. Others may be formed by wing sheets stiffened by angles or some other structural form around their edges. In Fig. 59 you see a wing being assembled in a "jig" at a modern airplane plant. Part of the frame is covered with metal skin. At the uncovered sections the ribs are visible, similar to the ones just described, in which holes have been punched for lightening. Trailing edge construction is clearly illustrated in the

PLAN FULL SIZE
FIG 65



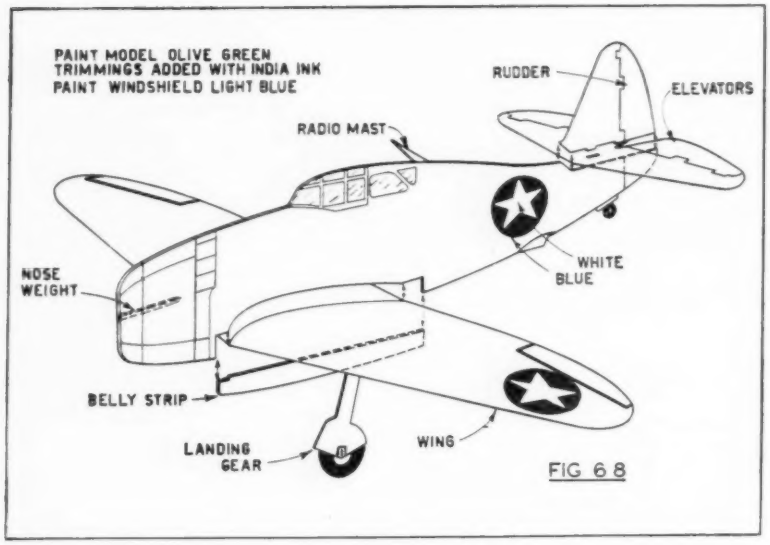


FIG 68

lower part of the picture.

Fig. 60 shows one of the first internally braced metal transports, the Ford Model 5D. Note that its wings are very thick compared to externally braced planes. This thickness gives great resistance to bending and allows space for sturdy bracing within. This design constituted one of the first steps toward streamlining the airplane. Note however that it still retains some of the old style features such as uncowled engines, non-retractable landing gear and square fuselage.

Fig. 61 shows one of the most modern skin stressed internally braced planes, the Brewster dive bomber. Wings are internally braced with spars and ribs built up from light sheet metal to give light but strong structural shapes; a metal skin covers the frame. The retractable landing gear is clearly visible. When in the air, wheels and struts fold inward fitting into the wells in the forward part of the wing and fuselage belly.

Characteristics of skin stressed construction can be illustrated best by constructing a model of this type. It is not necessary to include all the minor structural parts but just the main features of the skin stressed principle.

Let us proceed by building a model of the skin stressed Republic Thunderbolt in simple silhouette form. The model will be composed of five principal units: the fuselage, wings, fins, stabilizer, and landing gear. The fuselage can be made from a single wing sheet of basswood, or wood from a cigar box, 1/8" thick. This is first cut to the outline shown in the plans, page 12. First trace a paper pattern, cutting it out to the proper outline, using it to mark the outline and lightening holes on the wood, shown in dottted lines. The surplus wood outside of the outline is then cut away as shown in Fig. 62.

When the fuselage has the correct shape, cut out the lightening holes by first drilling holes at their corners, Fig. 63. Then with a sharp knife cut along the lines between the holes, carving away the wood until the lightening hole is shaped according to the plans, Fig. 64. These holes are necessary in order to lighten the model when constructing it of hardwood. If balsa is used no "cutouts" are required. At the nose, cut out a slot for the nose weight, completing the fuselage frame.

The stabilizer and fin then may be shaped; these are cut according to the outline given in the plans from 1/32" basswood. Lightening holes are also cut out of these, position and shape being indicated by the dotted line on the stabilizer plans.

Next, the wing may be constructed. First cut the under leading and trailing edge strips from 1/32" basswood and then the ribs from 3/32" stock. Cut the leading and trailing edge strips half-way through at their center perpendicular to their length as shown in Fig. 65.

All ribs, except the center ones, should be cemented to the leading and trailing edge strips as illustrated. The ribs' positions are indicated in the front view of the wing shown in the plans. Small pieces of paper, cemented to the underside of the strips at their center, prevent them from cracking when they are bent to give dihedral. The ribs may be held in place by small pins while cement is drying. Then bend the bottom strips at the center where they have been cut, raising their ends 5/8" and support them in this position illustrated in the wing front view, Fig. 65. While supported in this manner, cement the two center ribs in place and do not disturb until dry.

Now the upper surface of the wing must be cut out. This is equivalent to the upper stress resisting skin of a large airplane and in the model absorbs the bending stresses in conjunction with the leading and trailing edge under-strips. When the wing is assembled this upper sheet should be cut from 1/32" basswood. A pattern of the wing may be made from the drawing and its outline and lightening holes traced on the wood, indicated by dotted lines on the plans.

When all shaping has been completed, cement half of the upper wing sheet to the upper surfaces of the ribs and hold firmly in place with pins. Press pins through the upper wood sheet into the ribs at leading and trailing edges. Then apply cement to hold upper sheet to the leading and trailing edge strips. The second upper-surface wing sheet may be applied in similar manner. Be sure not to disturb or change the dihedral angle while performing these operations. To join the two upper sheets at the center, cover the joint with cement and allow the whole assembly to stand with tips supported until it is dry.

When the wing is thoroughly dry cement small brace strips in place to the upper surface between the ribs, as shown in Fig. 66. These are of hardwood 1/16" sq., cut to proper length. The wing is in inverted position and construction details are clearly

(Continued on page 60)

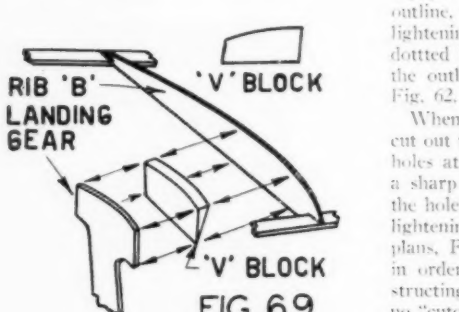


FIG 69

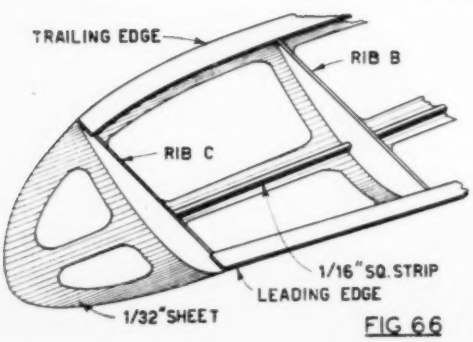


FIG 66

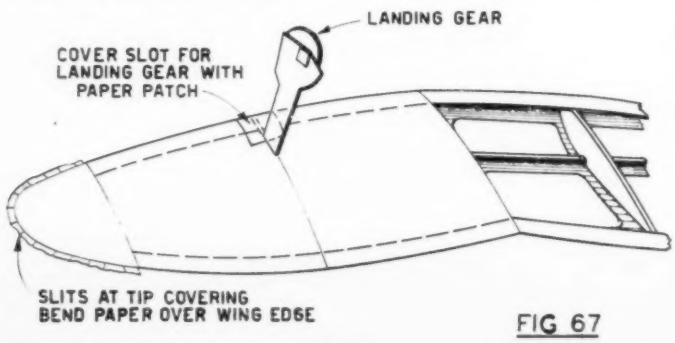
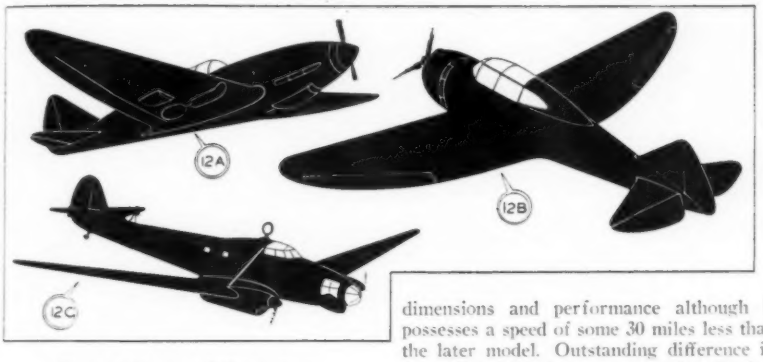


FIG 67



Description of Silhouettes

PLANE 12A—Caproni Reggiane RE 2001 single place fighter powered with an 1,150 hp. Mercedes-Benz DB 601 N engine. It has a span of 36 ft. 9 in., a length of 29 ft. 3 in. Very little information is known of the ship except that it is capable of speed of 348 mph. at 22,000 ft. altitude. According to reports reaching us from the African front, the RE 2001 is giving an excellent account of itself, which indicates German ideas must have infiltrated into Italian aviation.

PLANE 12B—Caproni Reggiane RE 2000, single plane fighter and forerunner of the "2001." Power is a 1,000 hp. Piaggio P XIR C 40 radial engine. The 2000 is similar to its successor with respect to dimensions and performance although it possesses a speed of some 30 miles less than the later model. Outstanding difference in the planes lies in the motor installation. The craft is armed with only two machine guns of large calibre. Although lacking in firepower, it makes up for this in maneuverability. It is reported that repeatedly in sham dog-fights with Messerschmitts Me 109s, the Italian fighter was superior.

PLANE 12C—Focke-Wulf FW 58 Weihe, twin engine bomber trainer powered by Argus As. 10C eight cylinder engines each developing 240 hp. It is fully equipped to accommodate complete bomber crews; gun installations, radio facilities and navigation instruments authentically simulate conditions to be experienced in bomber flying. The FW58 has a 68 ft. 10 in. span; 46 ft. 3 in. length, and wing area of 506 sq. ft. Top speed is estimated at 160 mph., service ceiling at 17,715 ft.

SKY SCOUTS

LESSON 12

MANY model fans can spot planes more readily than adults because they have been familiar with various types of ships over a period of time. Believing that they can be of invaluable service as spotters, the Sky Scouts was organized and a course initiated to supplement their knowledge and to assist in organizing units that will be of service on observation posts.

The course consists of a series of plane silhouettes with descriptions of outstanding characteristics published over a twelve-month period. Three or four planes have been presented each month; the first series appeared in the February 1942 issue; the twelfth and last is given on page 20 of this issue.

Anyone wishing to qualify as a Sky Scout must make a list of the names of planes in each series published after reading the accompanying descriptions and send each list to Sky Scouts, MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York City. When two sets of names have been received by us the candidate qualifies as a Sky Scout and receives his silver wings. When a complete set of twelve has been received at headquarters he becomes an Expert Sky Scout and receives a gold pin. Then, having completed his course of training, he will be given a membership card indicating his qualifications as a full-fledged member of the organization.

Abelardo Acosta of Cuba

Names of Expert Sky Scouts will be sent to defense headquarters with a statement of their qualifications for assisting in the national defense. All twelve lessons must be sent into headquarters to qualify for Expert Sky Scout. However you can start the course at any time, with this Lesson 12, for example.

If you have missed some it will not prevent you from qualifying because after these twelve lessons the entire twelve sets of silhouettes will be reprinted in one or more issues of this magazine; then you can list the ones you have missed and send them in to qualify as a Sky Scout (when two are sent in) or an Expert Sky Scout if all twelve are sent in.

Sky Scout members are in all parts of the country and in fact great interest has been shown in other countries of the Western Hemisphere; for instance, Abelardo Botjas

(Continued on page 30)

AMAZING AEROFACTS

by **A. V. ASHUN**

1. The Luftwaffe's Messerschmitt Me-109F, latest single seat service fighter, has a cambered airfoil vertical tail surface which gives a sidewise "lift" to counteract propeller torque, eliminating offset surface used on other planes.

2. A trans-continental airliner contacts the local station reporting its position, speed and weather conditions *seventy times* during the New York-Los Angeles trip. (Every 15 minutes!)

3. Two R.A.F. pilots recently figured that on their regular monthly pay prorated into hours and minutes, they received $1.70 for a trans-Atlantic ferry trip flying huge American-built bombers across the ocean. For this same trip, civilian pilots employed for the job got $500 with two trips a month guaranteed!

4. Parachutist Arthur Starnes' recent free-fall from 31,400 feet was just a hedge-hop compared to the 60,613 foot fall of Captains Orvil A. Anderson and Albert W. Stevens in Nebraska in 1934. After their balloon had exploded nearly twelve miles in the stratosphere, their tiny sealed gondola plummeted earthward until at an altitude of less than three thousand feet the intrepid airmen leaped into space and floated to earth in their parachutes!

5. Recent experiments with "pick-a-back" airplane launchings are antedated twenty years by the flight of a Bristol scout biplane from the upper wing of a Curtiss Flying Boat over England in 1916! The scout plane intercepted a German Zeppelin after the mid-air release!

6. German Messerschmitt fighters attacking England are fitted with Handley-Page wing slots invented by an Englishman, Sir Geoffrey Handley-Page!

7. Civil Airway emergency landing fields are located at intervals of 15 minutes flying time so that at no time is an airliner more than 7 or 8 minutes from safety!

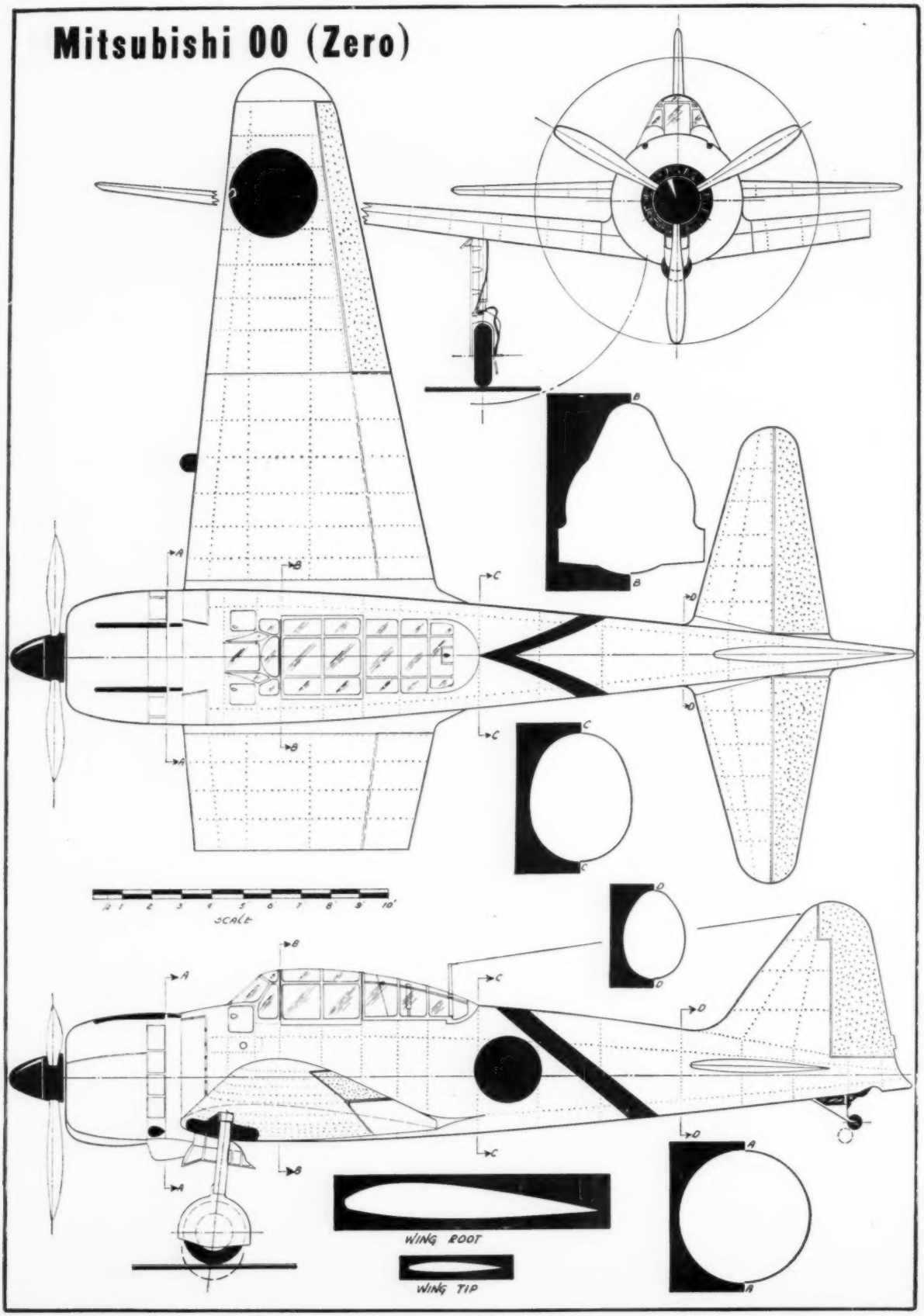
8. On target gunnery maneuvers different planes have their machine gun bullets dipped in different-colored wet paint which leave a mark on the target sleeve so that individual scores can be credited!

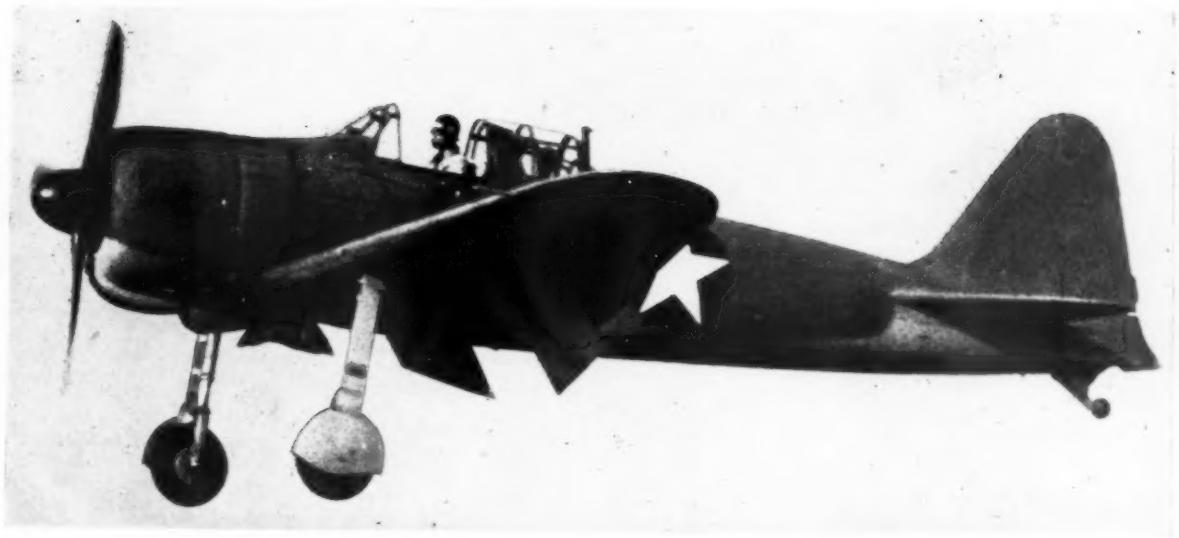
9. The aluminum alloy Alclad sheet used on modern fighters and bombers is less than *one-tenth* of an *inch* thick!

10. Major-General Frank P. Lahm, who, as a young second lieutenant became the first Army officer to fly an airplane, was recently retired as commander of huge Randolph Field, Texas. After receiving a short course of instruction from Wilbur Wright more than thirty years ago, he received pilot license No. 1. Now 64 years old (official retirement age) Lahm was also the Army's first balloon pilot!

(Continued on page 31)

Mitsubishi 00 (Zero)





JAPAN'S FLYING COFFIN

The plane on the cover

THE blue-green waters of the Pacific lapped against the rotted pilings of the pier, rocking it gently in unison with the naked feet moving methodically above. The queue of brown-skinned white-men stumbled away from the lone cargo freighter, their backs bent double under the load of crates and boxes and ambled along the pier towards the warehouse. And that warehouse bore the legend: *Port Moresby!* Sun-baked, lonely yet vital, was this tiny village this particular afternoon; lonely to those who called it home; vital to each and every liberty-loving man, woman, and child alive on this tortured planet. Suddenly they came, just white specks in the sky, like minute puffs of smoke hung by a giant hand to break the monotony of the ever-blue sky. There were two formations, each spread in a straggling "Vee," one half-a-mile behind the other. The piercing wail of the single siren echoed and reverberated across the parched village and someone screamed: "Zeros" and disappeared into a shack. And Zeros they were, nearly forty of them, come to ravage and beset this lonely outpost of freedom. Like white meteors, they screeched down from the heavens and fanned out in waves of flights, dancing wickedly across the rooftops, spraying wantonly whatever loomed before their guns. Again and again they came, smashing the parched shacks and buildings into dry kindling, beating those luckless humans caught in their grasp to the ground, destroying mercilessly, abandonly everything in sight. Three complete sweeps of the village while the pitifully few anti-aircraft guns spat at them! Then suddenly brown streaks flashed out of the South and lanced into their midst. One fell, then another. A blue star on a white field loomed for an instant against the brown side of one of the brown streaks and a voice spoke happily: "Cobras." The brown streaks were everywhere, it seemed, snapping wicked cannon shells into the Zeros, blasting them into a whimpering, scattered retreat, driving them from Port Moresby, taking a heavy toll of the red-circled Zeros. MacArthur's Bell Airacobras were in time, turning back the Zeros of the Mikado.

And this is not the story of a single day, but of many days at this lonely outpost. And the story, too, of the Philippines, of Midway, and of the Aleutians. Always in bands, always high, always turning tail at the sight of Allied planes. For the Zero attacks when none is looking, when none is prepared. It is the game of the Jap fighting man.

Few airplanes have achieved the notoriety of the Jap Zero in World War II—certainly none of the enemy planes and few of the Allied or even American planes. Possibly more fantastic tales have been told of the Zero, more weird stories and idle gossip than any other airplane flying today and interest has been aroused in actual details and straight facts in every quarter, from the man on the street to the aeronautical engineer designing planes to beat it.

Certainly no better authority exists for such factual information than the Bureau of Aeronautics of the Navy Department. And certainly they would have no better source of information than the actual airplane itself which, fortunately, they have actually flown and thoroughly tested.

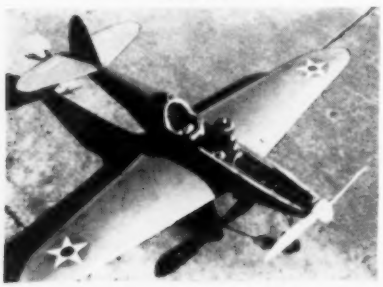
Just how the Navy obtained this plane is no military secret, for they obtained it by the simple process of shooting it out of the sky, plus a little luck in the fact that it was only slightly damaged in landing. Some weeks ago a Mitsubishi 00, as it is correctly known, was downed in the Aleutian islands. The plane, No. 108, of a carrier squadron, landed in marshland, turned turtle, and lay undiscovered for many days until a routine Navy scouting party stumbled upon it. The pilot was found hanging in his safety belt, head-down, and he was discovered to be tightly taped from waist

(Continued on page 54)

The captured Japanese Mitsubishi 00 (Zero) fighter, tested recently by Lt. Commdr. E. R. Sanders. Complete flight data was recorded

1. A 13" solid scale model of the Lockheed P-38 built by Tom Riccardi

2. C. T. Travis with his Airacobra U-control model. 3. *Below* The model with cowl removed



4. Dwight McSmith's speedy U-control job. 5. Wilfred Hendrickson built this 4-ft. span plane by installments of 15 min. each

AIR WAYS

News of Model Plane Experimenters from All Parts of the World

TEACHERS throughout the country have endeavored to teach model aeronautics to classes of young students on a number of occasions during the past years. Unfortunately these efforts usually have petered out after a few classes; not because of lack of interest among the students but invariably the whole matter terminated by the students teaching the teacher, rather than the reverse.

Most young fellows have been brought up during this expanding Air Age and consequently have absorbed a tremendous amount of aviation knowledge. This has not been the case with the teacher, who was educated at a time when aviation was not particularly popular. This condition has held back aviation instruction in the schools to an unbelievable extent.

Now however under the urge of necessity, the schools are faced with the problem of teaching aeronautics. The Civil Aeronautics Authority and other governmental agencies have recognized its value and stimulated interest and action by organizing the U.S. Navy scale modelbuilding program. Now that this is a success it has been found essential to revamp the educational system and teach various academic subjects in terms of aviation so our future men will be capable of taking their place in the new era, the Air Age, which is developing.

Teachers now are faced with the problem of instructing young men, some of whom are extremely well versed with aviation. Consequently, special aviation classes for teachers have been instituted in nearly all states to qualify them for this job; supplying teachers with necessary knowledge to carry on the subject in their classes.

However, we hear from the Academy of Model Aeronautics that the tremendous expansion of junior aviation activity has overwhelmed our educational system, so there is a great lack of qualified instructors. In desperation the educators have turned to the A.M.A. to supply instructors from the ranks of expert aeromodelers. So, at their request, each of the CAA Regional Educational Consultants has been furnished with a list of Academy Leader Members and as the need occurs Academy leaders will be called upon to either assist in this work themselves or to recommend others who are qualified and able to help.

(Continued on page 44)

6. A half size edition of Sal Taibi's Hornet built by C. J. Weaver

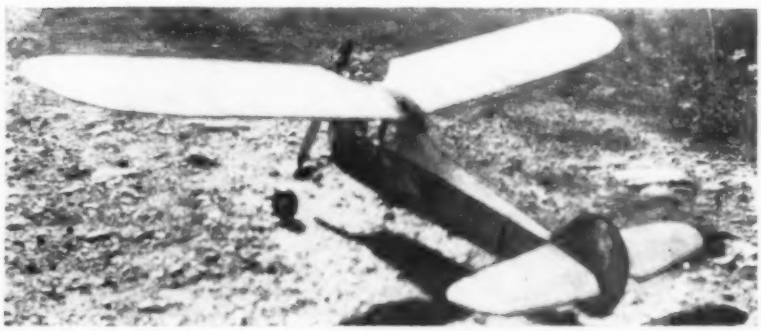
7. Ted Klotz and his sailplane that won in the soaring event

11. Ted Klotz' winning gas job is beautifully designed for stability and efficiency

8. Charlie Bristol cleans up! He is one of the West's foremost gas model experts

12. Some model!! A detail scale Gulfhawk built by Douglas Leek

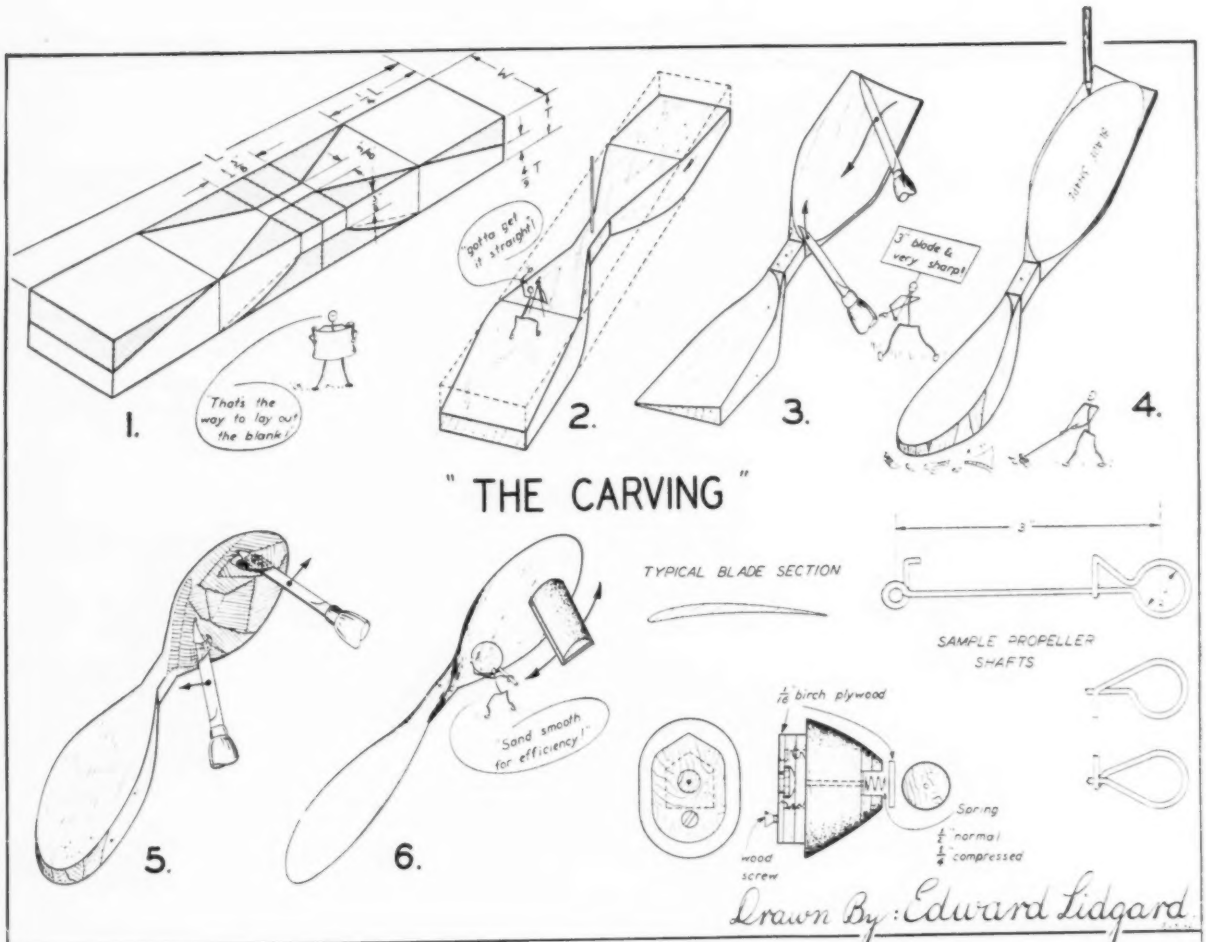
9. Charles Williams tunes up his modified Zipper.

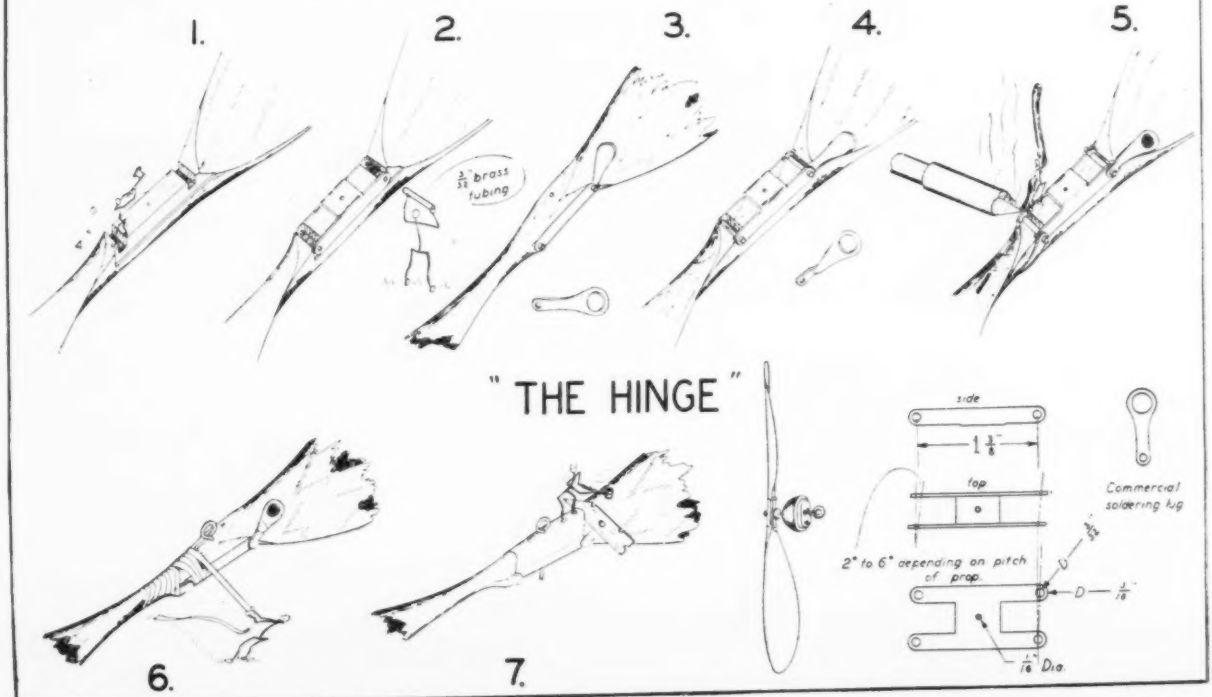


13. Here is a real high performance Class A gas job by Bob Kramer.

10. *Below* The Balsa Hawks, out for some flying, still get their balsa

14. *Below* Members of the Northrop Model Airplane Club


1.
That's the way to lay out the blank!
2.
Gotta get it straight!
3.
3" blade & very sharp!
4.
"THE CARVING"
5.
6.
Sand smooth for efficiency!
TYPICAL BLADE SECTION
3"
SAMPLE PROPELLER SHAFTS
1/16" birch plywood
Spring
1/8" normal
1/4" compressed
wood screw
Drawn By: Edward Lidgard


1.
2.
3/32" brass tubing
3.
4.
5.
"THE HINGE"
6.
7.
side
1 3/8"
top
Commercial soldering lug
2" to 6" depending on pitch of prop.
D — 1/8"
1/16" Dia.

TOPS IN PROPS

Simple design considerations, layout and carving of efficient propellers

by EDWARD LIDGARD

DO YOU agree that the propeller is the most important part of your airplane? Streamlining, airfoils and basic design are also very important, but put a "bum prop" on the world's finest model and it becomes a flop. What makes a good propeller? Some fine points are debatable, but we believe everyone will agree on the following:

1. Design of pitch, diameter and area to suit power available and airplane it will propel.

2. Proper blank layout to give utmost efficiency and maximum thrust at all stations.

3. Carving technique to obtain the efficiency that has been designed into the blank.

4. Simple, light and positive operating fold-back mechanism.

5. A fuselage contoured to match the propeller for maximum streamlining in climb and glide.

So now we'll discuss each factor and see what we can discover.

First of all, we have the relation of diameter, pitch and area to the plane itself. This topic treads on dangerous grounds as you have probably found from past sessions of hanger flying.* However, there are certain relations which we would like to bring forth. A propeller is actually in some respects a wing, therefore its area is important; if there is a given amount of power available we want to use it to the best advantage. Too little area will result in high r. p. m. and low lift or thrust; too great area will put a great drain on available power and slow the r.p.m. down, and again thrust will suffer. So remember correct area gives maximum thrust through more efficient absorption of power. We also find that the greater the area the greater the torque.

A simple rule to aid in "guesstimating" is this: Once the diameter is known divide by a number corresponding to a desired aspect ratio. This will give you a blade width dimension. Aspect ratios (span divided by chord) for propellers should not be lower than six, nor higher than eleven. A 16" propeller would therefore have a possible blade width ranging between 2.6" and 1.45", but 1.75" is more desirable and has an A/R of nine.

Propeller pitch usually depends upon the characteristic manner in which the individual handles his model. By this we mean some modelers prefer a short rocket-like climb and therefore use a low pitched propeller; others prefer a longer, more leisurely climb, gained by using a high pitch propeller generally obtaining about the some altitude but taking a longer time to get there. The latter is, from a duration standpoint, much better. Here is why!

A model with an extremely powerful climb can get to 250 feet in 15 to 20 seconds from which altitude it may glide for 2 minutes. Total time 2:20. A model with a slow climb may take as much as 1:15 minutes to reach the same altitude. Total time 3:15. Looks better doesn't it? However, the average model to serve under all weather conditions would by such comparison methods have a power time of 45-50 seconds and an average flight time of 2:45—under very good conditions.

To simplify propeller comparisons we will use a pitch diameter ratio or P/D. So instead of saying 16" propeller of 20" pitch, we will say "a propeller of 1.25 P/D" (20 ÷ 16 = 1.25). To determine the pitch of a propeller using propeller block dimensions, we use this formula:

The most efficient propeller; or one giving maximum power for a given output of power, will have a P/D of 1.3.

Getting back to our previous comparisons the models mentioned would have propellers the P/D's of which would be approximately 1, 1.8, and 1.5 respectively.

So now we know pitch, diameter and blade width of our proposed propeller. How can we lay out a propeller blank in such a manner that when finally completed the propeller will yield maximum thrust on a given amount of power?

Some years ago Gordon Light improved on the old "X" type block layout and showed us how to carve a propeller from the smallest possible block. Since then we have found out a few more things about airflow, and our propellers can now be made more efficient. We know the blade angle at every station of the blade should be such an angle that each portion of the blade will cut a slice from the air fluid it passes through; that it will want to travel the same distance in one revolution as every other portion. If any one portion has too high an angle, it will absorb more than its share of power and slow down the r. p. m. with a resultant thrust loss. Any portion having too low an angle will produce no thrust for the drag it develops, and although the r. p. m. may stay the same or even increase slightly, a loss of thrust will result and efficiency will be lost. In other words no variables considered, the propeller should have a "helical" pitch. It has been found in tests and proved by flight results that the air does not flow over the propeller in the smooth manner in which we once thought it did; there is a tendency for air to flow over the tip and hub at a lower angle than a smooth straight flow. Now to counteract that tendency and have each blade portion bite into the air fluid at an efficient angle, we reduce the blade angle at the tip and the hub so the air does strike the blade in a helical manner.

Sketch No. 1 shows the layout of a pro-

(Continued on page 34)

*Impromptu debates, discussions, or just bull

AIR YOUTH

(A Division of the National Aeronautic Association)

Official Model Airplane News Prepared by R. W. Nichols

NACA Hires More Modelplane Builders

THE government's aeronautical testing laboratory, the National Advisory Committee for Aeronautics, is hiring more under aircraft modelmakers for employment at Langley Field, Va., headquarters. According to an announcement by William R. Howell, Special Representative of the U.S. Civil Service Commission and Charles A. (Tom) Hulcher, A.M.A. leader member in charge of the work of Under Aircraft Modelmakers at Langley Field, a number of vacancies now exist for boys and girls who are model builders and fliers.

At the present time, boys with the necessary qualifications are employed between the ages of 16 and 19½ years, and girls are employed between the ages of 18 and 25 years of age. The starting salary for these Modelmakers is now $1320 per year base pay, plus additional pay for regular overtime.

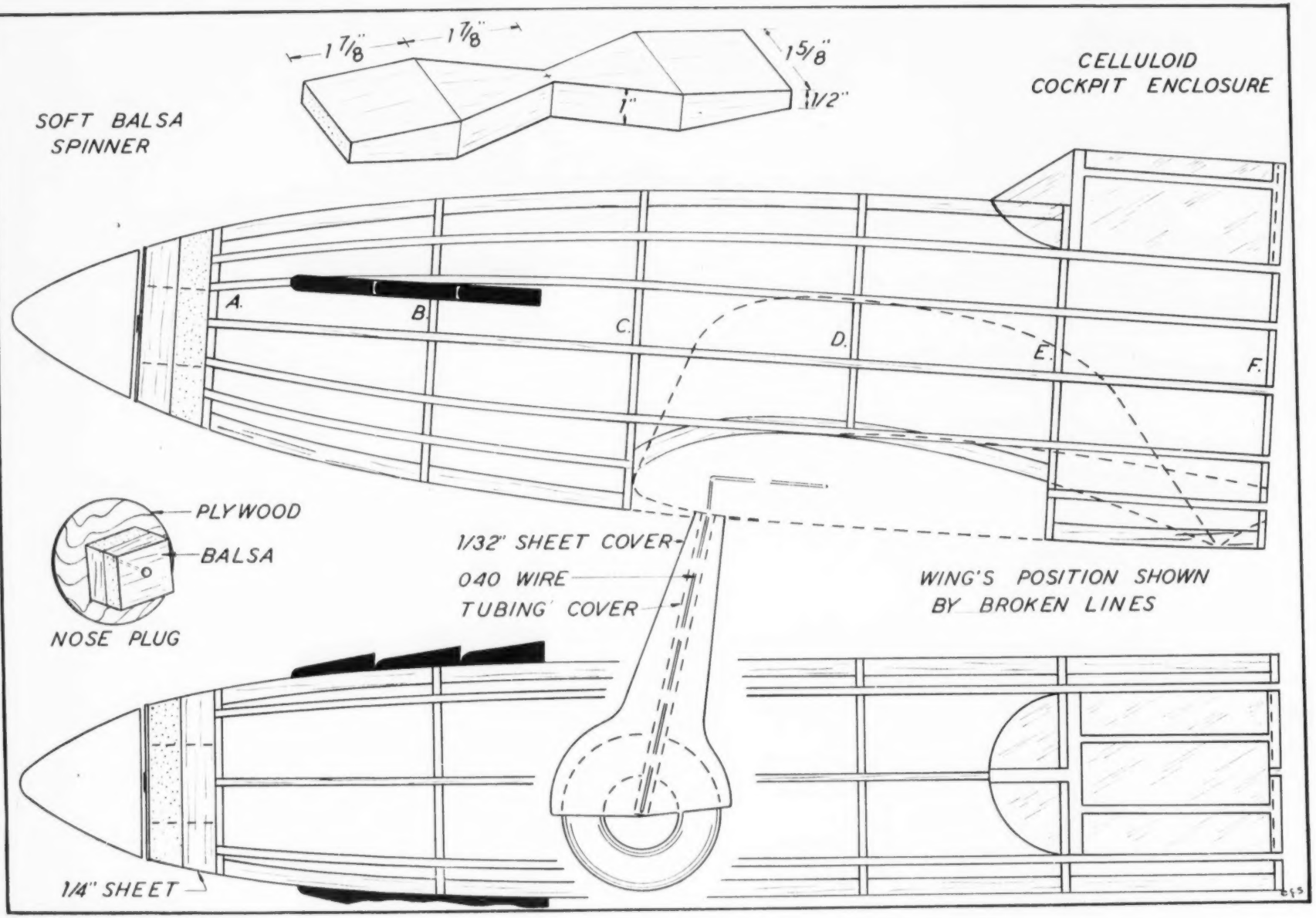
These boys and girls will receive special and intensive training in the mechanical fields of this research work. They will be engaged in one of the twelve aircraft trades and the boys whose work warrant it, will receive formal apprenticeship training approved by the U.S. Department of Labor. Advancement will progress with the speed with which the Modelmaker masters the various phases of his work.

The work of the NACA is a hundred percent war work and is extremely vital to the development of our military aircraft. The NACA is engaged in research which will continue on after the war is over and is therefore interested in building up and training a permanent personnel.

Model builders meeting any one of the following requirements may be appointed for employment. 1. He or she must have served six months as a resident student at a qualified aircraft school. 2. He must have worked for six months in the construction of full scale airplanes. 3. He must have successfully built and flown in formal competition at least one model airplane.

Applicants who are interested in employment at the laboratory should write to Mr. W. Kemble Johnson, Acting Administrative

(Continued on page 40)


1 7/8"
1 7/8"
1 5/8"
1"
1/2"
SOFT BALSA SPINNER
CELLULOID COCKPIT ENCLOSURE
A.
B.
C.
D.
E.
F.
PLYWOOD
BALSA
NOSE PLUG
1/32" SHEET COVER
040 WIRE
TUBING COVER
WING'S POSITION SHOWN BY BROKEN LINES
1/4" SHEET

BUILD AND FLY THIS RUSSIAN FIGHTER

Complete data and plans to construct a flying model of the famous high speed Soviet fighter MIG-3

by **EARL STAHL**

Top Here she comes around the first turn at full speed (a real flight picture). *Above and below* Two views showing its smooth efficient lines and realistic effect when carefully decorated

NEARLY two years of war has proved the Soviets have aircraft of modern design and outstanding performance. Probably the fastest and most formidable fighter of the Red Airforce is the 1-18 or MIG-3 single seater. In appearance it bears a marked resemblance to the early Curtiss XP-37 from which the now famous Curtiss P-40 was developed.

Specific information about all Russian warplanes is a closely guarded military secret, however a few details about this fighter are known. The sleek-lined 1-18 is powered by a 12 cylinder, liquid cooled Mikouline engine of 1,250 hp. which is said to give a top speed of more than 360 mph. at 13,000 ft. Wing span is 36 ft. 6 in.; length 32 ft. and gross weight, 6,200 pounds. Armament consists of four machine guns and two cannon. Construction is unusual in that the forward part of wing and fuselage are metal while remainder of the structure is plywood.

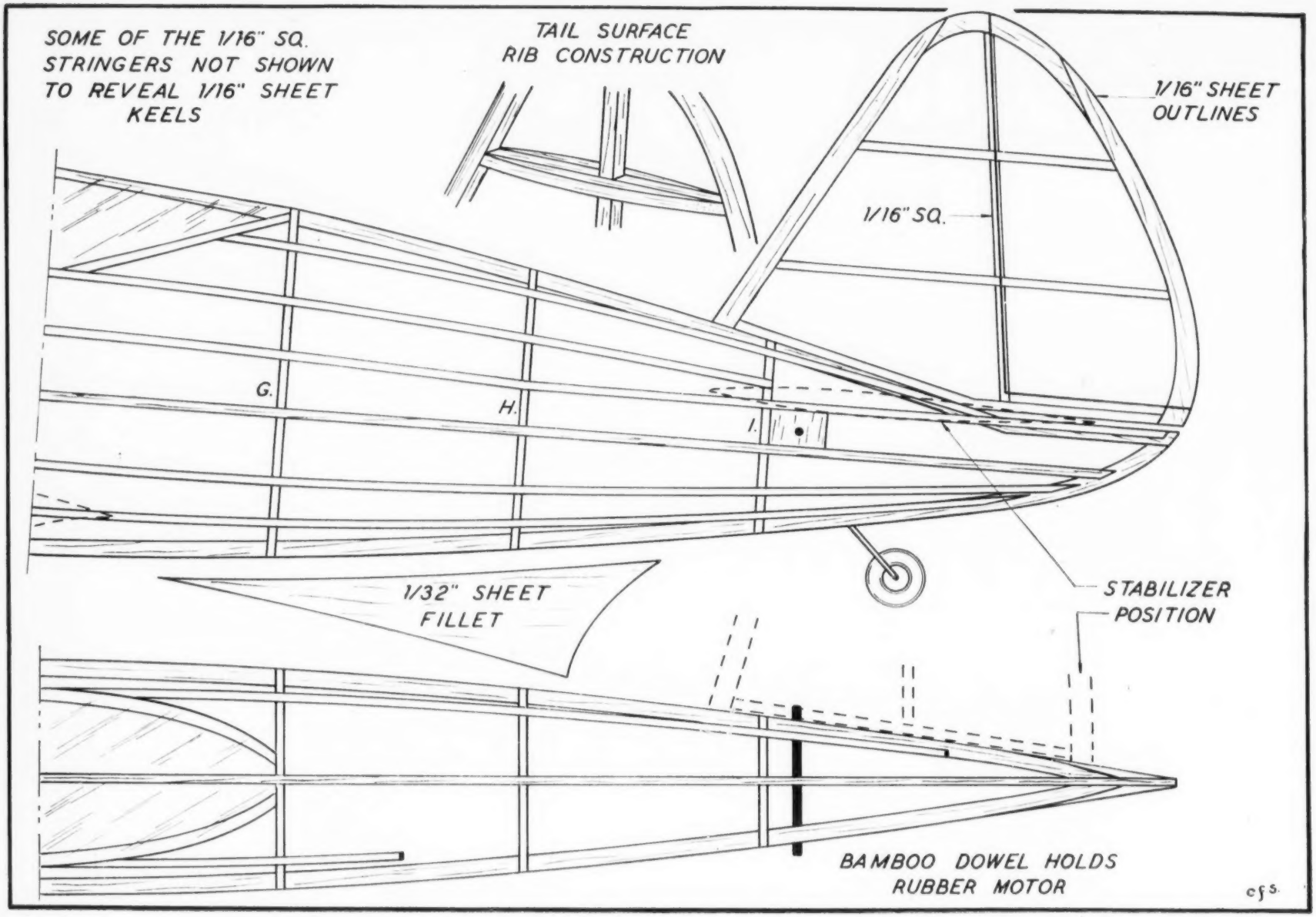
So much for details of the real fighter. The sleek, graceful lines of the 1-18 make it an attractive subject for a flying scale model. Because of its excellent proportions it is ideally suited for flying and the author must add that his 1-18 is without exception one of the best low-wing scale models he has built.

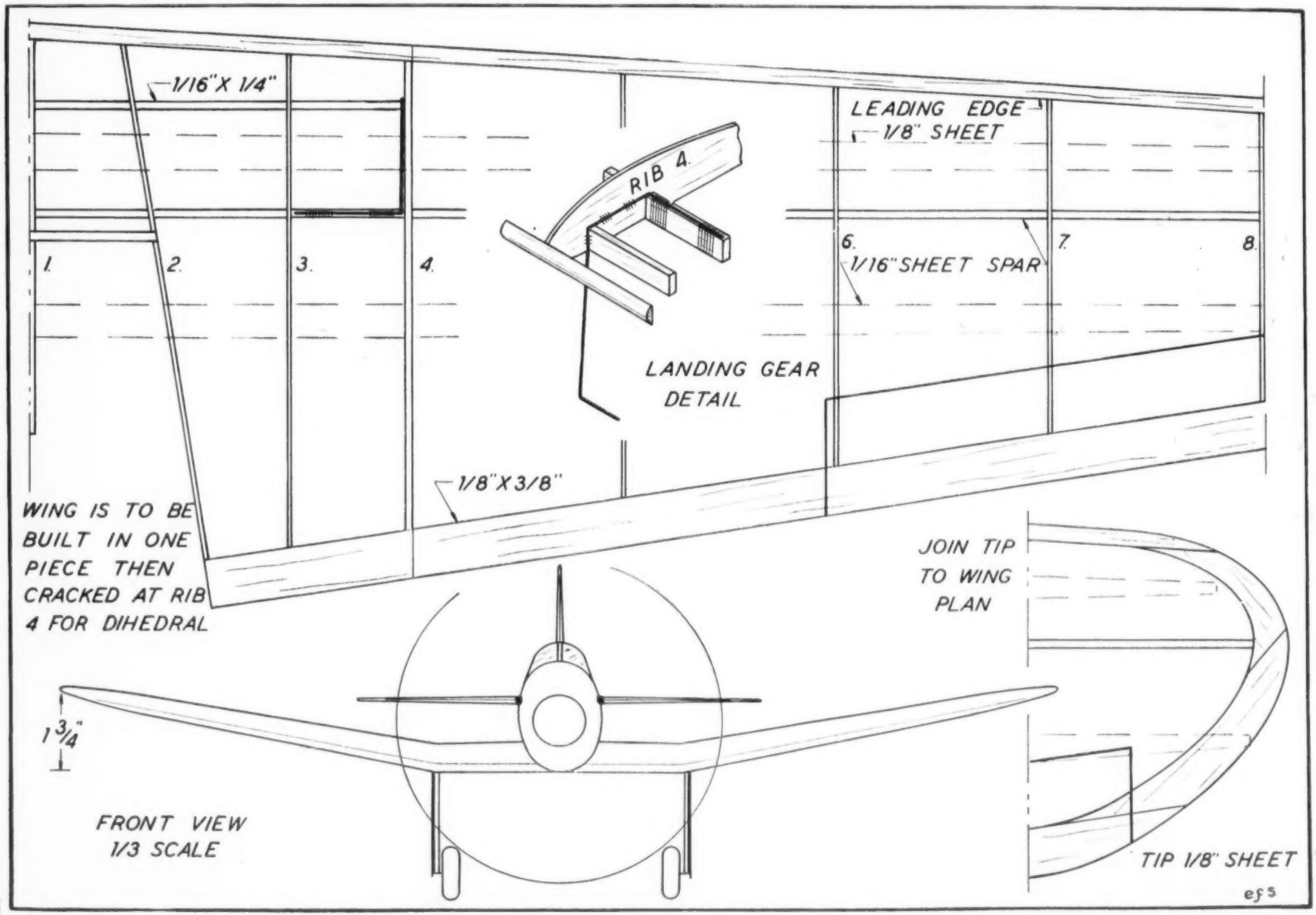
The model is simply constructed in the conventional manner. While the test ship was designed for and incorporated balsa wood in the structure, it is readily adaptable to construction using slightly heavier white pine and basswood now being sold at some model shops. All wood should be selected carefully to assure the lightest, strongest structure possible. In the process of assembly all frames should be made with accuracy and each joint cemented firmly.

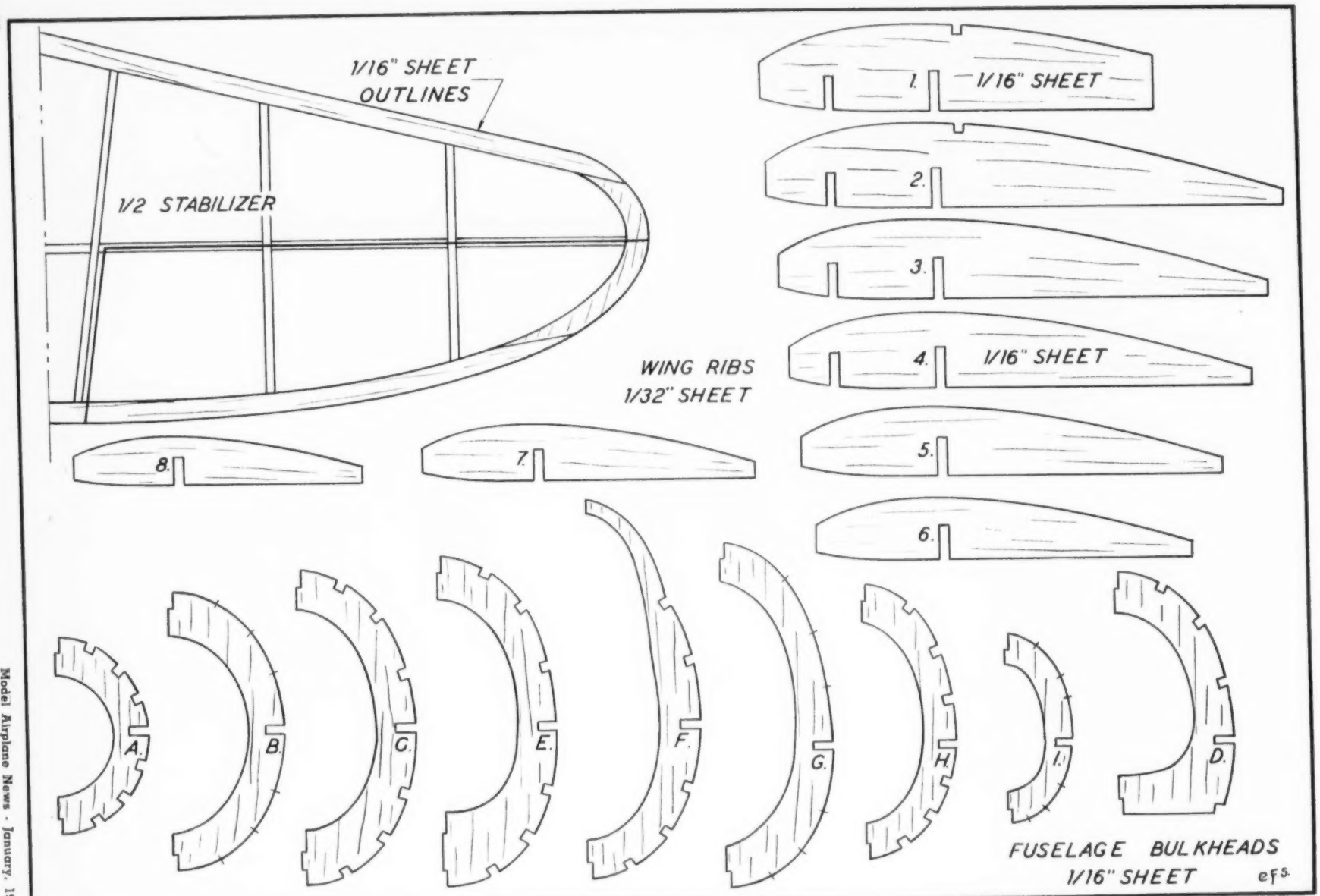
CONSTRUCTION: The manner of fuselage construction calls for use of four keels cut to shape from 1/16" sheet. To obtain their patterns, trace the top, bottom and side outlines of the body. Bulkheads, likewise 1/16" sheet, are cut in accordance with patterns given. Cut only the notches shown leaving the others to be cut as a later operation; their positions should be marked, however, for reference.

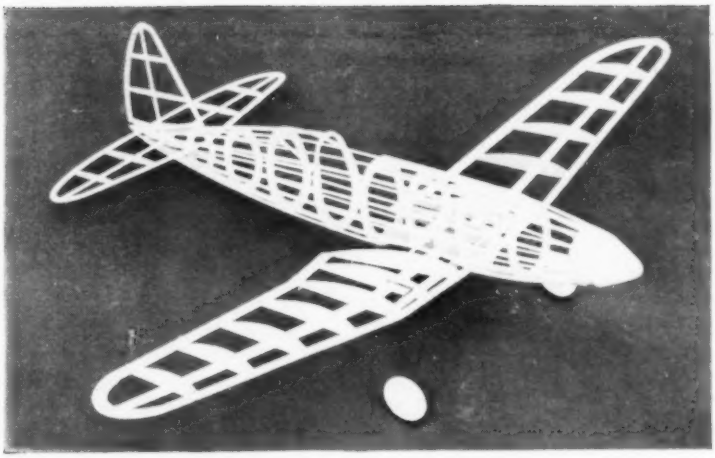
Pin the top and bottom keels to position

(Continued on page 29)


SOME OF THE 1/16" SQ. STRINGERS NOT SHOWN TO REVEAL 1/16" SHEET KEELS
TAIL SURFACE RIB CONSTRUCTION
1/16" SHEET OUTLINES
1/16" SQ.
G.
H.
I.
1/32" SHEET FILLET
STABILIZER POSITION
BAMBOO DOWEL HOLDS RUBBER MOTOR
cfs.


1/16"X 1/4"
LEADING EDGE
1/8" SHEET
RIB 4.
1.
2.
3.
4.
6.
7.
8.
1/16" SHEET SPAR
LANDING GEAR
DETAIL
1/8"X3/8"
WING IS TO BE
BUILT IN ONE
PIECE THEN
CRACKED AT RIB
4 FOR DIHEDRAL
JOIN TIP
TO WING
PLAN
1 3/4"
FRONT VIEW
1/3 SCALE
TIP 1/8" SHEET
efs


1/16" SHEET
OUTLINES
1/2 STABILIZER
1. 1/16" SHEET
2.
3.
4. 1/16" SHEET
WING RIBS
1/32" SHEET
5.
6.
7.
8.
A.
B.
C.
E.
F.
G.
H.
I.
D.
FUSELAGE BULKHEADS
1/16" SHEET
efs



Above The completed framework, light and sturdy

Right Ailerons, elevators and cabin are lined in black

Build and Fly This Russian Fighter

(Continued from page 25)

over the side view and then cement half the bulkheads to place. Attach a side keel and then, when dry, remove structure from the plan and add remaining bulkheads and keel. Stringers are 1/16" sq. stock. Attach the ones nearest the side keels first, cutting notches as required. Always attach stringers to corresponding positions of each side at the same time to prevent pulling the body out of line.

Between bulkheads C and E, where the wing fits in, curved pieces are cut from 1/16" sheet and fitted so as to make the fuselage slides fit to the wing curvature. Other items to be assembled to the fuselage are the curved pieces of 1/16" sheet which form the back of the cockpit enclosure and the small blocks of hard sheet stock in the rear which anchor the rubber motor.

The nose block, just forward of bulkhead A, is made from two pieces of 1/4" sheet balsa cemented cross-grain. Cut out the center for the nose plug, then roughly cut to shape before cementing to the nose for final finishing, by using rough and then fine sandpaper.

For those builders using white pine or bass it is suggested the same procedure of construction be followed but bulkheads of 1/32" or 1/20" thickness should be sufficiently strong. Stringers of 1/32" x 1/16" size placed with the narrowest side next to the covering will be of about the same strength and weight; if this size stringer is not available, 1/16" sq. stock sanded smaller will be all right.

Few details are required to outline the method of constructing the tail surfaces. Study the plans and it will be noted that both stabilizer and rudder are made in a like manner from 1/16" thick stock of the indicated width. Make flat frames of both (the stabilizer is made in one piece) then when the cement has set, remove from the jigs and cement soft 1/16" sq. strips to each side of each rib. These are later cut to the streamline shape indicated and edges are tapered to conform to the rib shape.

If it is necessary to use wood other than balsa for the stabilizer and rudder, it must be remembered that they must be of light but strong construction. To accomplish this reduce the size of the various parts and eliminate streamline cap strips over the ribs. Cement everything well so there will be little tendency to warp.

The wing is easiest assembled in one piece; the builder will have to make a left side plan as there was insufficient room for it on the drawings. Ribs are cut from 1/32" sheet except as noted and two of each is needed except No. 1. Sand them carefully to exact size and cut the notches for spars. Spars and leading edge are cut from sheet stock as indicated and the trailing edge is a tapered strip of 1/8" x 3/8" stock. Tip pieces are cut from 1/8" thick material and are assembled over the plan. With pins hold the various parts in place over the plan until the cement has set. When dry, crack the spar and edges and elevate the tips to indicated dihedral; recement the joints firmly. Finally trim and sand the leading and trailing edges to conform with the airfoil shape.

To keep weight at a minimum the builder using heavier wood will have to use material of smaller crossection, particularly the leading and trailing edges. Ribs should be cut from the thinnest stock and lightening holes at points of little stress will reduce the overall weight.

A landing gear of the type used on the model 1-18 is very rugged yet accurate in appearance; it is easily made from .040 music wire. The top of each strut is bent in such a manner as to join the spars and rib No. 4. Be sure to make a right and left strut. With thread bind the struts to the spars and then use a needle and thread and sew right through the rib and about the wire. Strengthen the whole area by applying several coats of cement. The rubber tubing (or any other kind of tubing) and balsa landing gear covers are not added until later.

Lightweight wheels can be purchased or they may easily be made from scraps of 1/8" sheet balsa that have been laminated together. Washers or bearing should be attached to each wheel so they will turn freely and accurately.

Select a very hard balsa or soft white pine block of the correct size for the propeller. Drill the tiny hole for the prop shaft and then cut out the blank as shown. A right-hand prop is to be carved. Cut away the back face of the blank first until the backs are as desired, then cut away the front until the blades are of the proper thickness. Reduce the depth of the hub and shape the blades in a manner similar to the prop on the original model. With rough and then fine paper sand the propeller to a smooth finish. Shape the spinner from a light grade balsa block, then notch it to fit over the prop hub. Before the spinner is attached permanently, the type of free-wheel gadget to be used, if any, should be considered and provisions made for it. Apply several coats of clear dope with light sanding between each to smooth and harden the surface.

The removable nose plug is shown in perspective. A disc of 1/32" plywood forms the front portion while the back is laminations of 1/4" sheet balsa. Fix the line of thrust by cementing washers to the front and back of the plug.

For the propeller shaft use .040 music wire. A loop to which a mechanical wind-

er can be hooked should be bent on the front of the shaft. Place several washers between the propeller and nose plug to reduce friction.

Work over the entire structure with fine sandpaper to prepare for a neat covering job. Regular colored tissue or Silkspan is used and banana oil or thin dope is the adhesive. Use individual sections of tissue for each flat section of each side of the wing, tips, tail surfaces, etc. In covering the fuselage it will be necessary to use numerous small pieces to work around the curves without wrinkles; the tissue must be lapped carefully to assure a neat job. Lightly spray the covered parts with water to tighten the tissue. The flying surfaces must be supported level while drying so they will not warp.

Assemble the covered parts in this manner: Fit the wing into the recess in the fuselage and cement it fast—if the structures have been made with accuracy, the incidence will be correct. Wing fillet patterns are given and two are cut from 1/32" sheet. They are to fit accurately from fuselage to wing and may need a bit of alteration to fit exactly on *your* model. If the builder desires, the trailing edge of each fillet may be strengthened by laminating another small piece of 1/32" sheet to the underside. Finish the opening from wing to fuselage on the bottom with 1/16" sq. strips and then cover this area and the fillets with colored tissue. It will be necessary to temporarily cut the top keel and last bulkhead to admit the stabilizer which is cemented fast at the angle shown. Cement the rudder to place with a bit of offset to counteract torque. Tissue fillets are placed between the tail surfaces and fuselage. Any wrinkles in the covering should be moistened with water and permitted to dry before the entire model is given a coat or two of clear dope.

Now to add the more minor details. The cockpit enclosure is made from thin celluloid. Make paper patterns of each section of windshield before cutting the parts from celluloid. When cementing to place be careful to avoid cement smears. The structural detail is represented by doping thin strips of black tissue to the transparent enclosure. Rubber (or similar) tubing of the correct diameter is slipped over the vertical portion of the landing gear wires. Wheels are colored and then held to the axles by small washers soldered to the ends. The outer landing gear covers are cut from 1/32" sheet and then covered with tissue to match the rest of the plane. The red Russian star and other decorations can be cut from colored tissue and doped to the covering. Control surface outlines are simply thin strips of black tissue doped to place. Items such as the tail wheel, exhaust, ports, etc., are made from scraps.

FLYING: Our original test model is powered with six strands (three loops) of 3/16" flat, brown rubber. It is best to lubricate the motor before placing it within the fuselage. Hook the strands to the prop shaft and then drop the other ends through the fuselage. It may be necessary to remove a small portion of the covering in the rear in order to get the strands into position to be held by the removable bamboo pin.

Make first flights over soft grass but if none is available, make first tests R.O.G. with but a few turns. In all probability the model will be out of balance so a small corrective weight may be needed. As correct balance and stability are attained increase the number of turns. Off-setting the thrust line will aid in controlling the amount of circle in either direction, and by tilting the thrust line down a tendency to stall can be eliminated. For maximum performance stretch the rubber motor and wind with a mechanical winder.

VICTORY

Pilot "Spee-Dee"

(Continued from page 9)

they will be more alike than if one at a time were made. After that is done the firewall can be cut out of plywood as shown on the plan. The fuselage is now to be finished, so separate the two sides which by now are dry and add the crosspieces; notice that the bottom on the forward part of the fuselage is narrower than the top. After the crosspieces are in position the front bulkhead is cemented in place.

The balsa blocks are now added to the top and bottom of the ship. They are cemented to the fuselage lightly so they can be removed after. Shape the blocks to conform with the plan and with the former. After they are shaped to the shape that is wanted they are removed and hollowed to 1/4" wall thickness.

The lower cowl is now cemented in place, while the upper one is held in place with a small rubber band. The landing gear is now bent to shape and bolted in place with clamps. The motor mounts are cut and bent to shape and then are bolted to the firewall. This will depend upon the motor used, however, they must be lined up so they will hold the motor and the thrust line will be the same as on the plan. The cowl for the motor will now be made; this is made in two blocks so that it can be hollowed out after it is carved to the shape the plan directs. When the cowl is hollowed out be sure to have the wall thickness at least 1/4" thick, as the heat of the motor will warp it out of shape if the motor comes too close to the cowl. Just cut that part of the cowl, for if the motor is too near the cowl it is apt to burn.

The ignition is now installed; locate the coil and battery box as shown on the plan as this is where it will best be suited. However, the battery box may have to be moved in order to get the ship to balance perfectly.

The tail assembly is now made. As this is an all balsa job merely cut out the shape and streamline to the section shown. Cut out the tab and insert the bass sheet; this is used as balsa that thin would bend out of shape. Bend the wire hinge and fasten it. Cut the hinges out of thin brass and wrap around the wire and cement to the balsa stabilizer. This forms the hinge.

The wing is now made. Cut the leading edge, along with the wing tips and trailing edge which alone is pine. Cut pieces out of 1/8" sheet and cement in place, after which shape to the rib template. After the two halves are made they are joined with a plywood gusset with the two tips at a 1/2" dihedral. Cut

the line guide out of plywood and cement to the third rib of the wing as shown on the plan.

The control plate, which is cut out of pine, is now cemented in place and the movable control plate is cut to shape and bent as shown. After the holes are drilled, assemble, using rubber bands to keep the control in neutral and pins to regulate the movement that will be wanted to fly the ship or loop her. Bend the 1/16" diameter wire to shape and hook the U to the movable control plate and the other end to the U on the elevator. Slip on the flying wires and that completes the control system.

The ship is now covered with Silkspan and given several coats of clear dope, color dope is then applied. After each coat the ship should be sanded with fine sandpaper; this will allow the next coat to be applied without any trouble as the dope does not take readily to a glossy surface.

Flying is done with the aid of a friend. Have him start the motor and with you at the controls let the ship fly down-wind to take off. As the ship gains speed it will want to lift so give it a little help by pulling on the line that raises the stabilizer; this will cause the ship to bounce into the air and be on its own. Here you must be calm as the ship will fly by herself if let alone, but the average person tries to over control the ship and that usually results in a crackup, so take it easy and you will have your ship to fly over and over. No tricks should be tried till the pilot has had plenty of slow flying and knows how to take the ship off and land her without any trouble.

VICTORY

Amazing Aerofacts

(Continued from page 17)

11. In terminal velocity dives of high speed military planes, wings do not pull or tear off, they twist off! As the dive progresses there is a download on the leading edge and an upload on the trailing edge built up which, if greater than the designed wing strength, twists it out by its roots!

12. The first enclosed cabin plane was a Bleriot design flown by Pilot Legagneaux in France in 1912!

13. A modern pursuit has 40,000 rivets; a bomber, 500,000 and the new superhemisphere bomber, 3,000,000! A modern double row radial engine has more than 8,000 individual parts!

14. The world's first aviation wind tunnel was designed and built by Dr. A. F. Zahm of Washington, D. C., in 1901! He measured its throat velocity by tossing small inflated balloons into the flow. He discovered skin friction and held the first Aeronautical Congress in Chicago in 1893, after inventing a three-way (aileron, rudder, elevator) control system in 1891!

15. The vacuum system of a modern combat plane sucks air from the rear of gyro instruments, passing through the pump, and goes into the de-icer system as air pressure!

16. James V. Martin, aviation pioneer, sued the entire aviation manufacturing industry for one billion dollars charging infringement of his original airplane patents. Litigation was in court for ten years and seven different decisions were handed down before Supreme Court finally rejected final appeal. Had he won, airplane costs would have doubled regardless of make or model due to the high license fees he demanded!

17. Lieut. Commander Anthony Leo Danis, skipper of the ill-fated U. S. destroyer "Kearney," received orders to join the crew of the Shenendoah dirigible the day it was destroyed, was transferred from the Akron ten days before it was lost in the Atlantic and was one of the survivors of the ill-fated Macon which crashed in the Pacific in 1935!

18. The two-speed superchargers used on today's high powered aircraft engines functions exactly as the gear-shift on your automobile with a clutch and shift lever changing into high or low!

19. Airplane fuel tanks have a vent line which keeps the tank open to air at all times! This line has a large kink in it preventing loss of fuel during violent maneuvers!

20. A recent survey showed that there are more than a *quarter-million* readers of each issue of MODEL AIRPLANE NEWS.

VICTORY

Air Power Triumphant!

(Continued from page 8)

On July 17th, at Tulagi, one B-17 engaged three Zeros. The B-17 was not damaged. One enemy plane was shot down and one was left burning.

On July 19th, in the Rabaul area, five B-17s engaged ten Zeros. None of the American ships were damaged but one Jap was shot down and two "possibles" were scored.

And then there are the well-known examples of Captain Wheless, whose aerial gunners fought off a sustained attack by a squadron of Zeros during a running fight of more than 75 miles and Captain Sharp, whose crew fought 23 Jap Zeros for two hours over Burma, destroying at least four of them before being forced down.

And possibly the most famed action of the entire war for B-17 type was the August 19th raid on the Dieppe area during which a squadron of Flying Fortresses raided the key German airfield at Abbeyville, 38 miles from Dieppe. A British pilot, who flew one of the escorting Spitfires, described the assault as "simply incredible." "We were flying top cover and could see everything" he told reporters after the raid. "Those Fortress fellows hit everything on that airfield. Their bombs fell perfectly from a great height directly on the hangars, buildings, and key spots with only one stick wide and that hit a runway. I didn't think it could be done. It was better bombing than anything I've seen in this war even by planes flying thousands of feet lower."

Two days later, on August 11th, eleven of the Flying Fortresses returned and shot down six of Germany's highly praised Focke-Wulf Fw-190 fighters (MODEL AIRPLANE NEWS, November 1942 issue). The 20-minute battle started when 20 to 25 of the speedy German fighters swarmed to attack the American planes. One Fortress was badly damaged but it managed to return to its base.

The British have called the Consolidated B-24 Liberator bomber (MODEL AIRPLANE NEWS, September 1940 issue) one of the finest military aircraft yet produced. While it is true that the bombloads carried by the B-17 and B-24 bombers (From three to five tons under varying conditions of loading) are less than those which can be carried by the new British four engine bombers (eight tons), their range is far greater. The American bombers were built with an eye to vast distances while the British ships were designed for and have been used in the European war almost exclusively with the local German industrial centers as their principal targets. The American bombers also have been designed for daylight bombing of specific military targets—a mission requiring greater speed and gun-power than any type of night bombing.

The B-24 immediately became the backbone of the Atlantic Ferry service from Canada to Great Britain when it was inaugurated last year and, even prior to the United States' entry into the war, these airplanes had completed more than 100 routine trans-Atlantic crossings in all kinds of weather, carrying such passengers as Ambassador Winant, Lord Halifax, Prince Bernhard, Lord Beaverbrook, Prime Minister W. MacKenzie King and the Duke of Kent. A B-24 took the Harriman Mission to Moscow early last fall and continued on around the world, flying approximately 24,700 miles. The B-24 has played an outstanding role in the battle of the Atlantic, attacking German submarines and supply ships and beating off German aerial sea raiders in many actions.

B-24s played a major role in attacks on the Italian fleet in the Mediterranean June 15th, scoring numerous direct hits on Italian battleships and other warships.

In the North American B-25 (MODEL AIRPLANE NEWS, August 1942 issue) and the Martin B-26 (MODEL AIRPLANE NEWS, March 1941 issue) the United States has a pair of medium bombers that definitely outclass anything in the world. They carry about two tons of bombs at speeds of over 300 miles per hour and are very heavily armed.

The B-25 gained lasting fame in the Tokyo raid and it had previously demonstrated its stamina and hitting power, however, when ten B-25s, teaming up with three B-17s, flew 2,000 miles from Australia to the Philippines to attack the Japs, with excellent results. In both attacks the B-25s ran away from the best pursuits the Japs could put in the air.

The Martin B-26 is regarded as a very advanced type. Reports from the Japanese theater show that it has speed and fire power enough to make it self-sufficient and that it can conduct raids over heavily protected enemy territory without fighter protection. At Lae, New Guinea, on July 4th, ten B-26s were intercepted by 15 Zero fighters. Four Zeros were shot down and one probably shot down with four of the B-26s damaged but returning safely to their base. One B-26 was lost, having had its wing knocked off by a falling Zero that had been shot down by another B-26. At Midway and up in the strategic Aleutian Island theaters, the B-26s have demonstrated their versatility by going into action as torpedo

(Continued on page 34)

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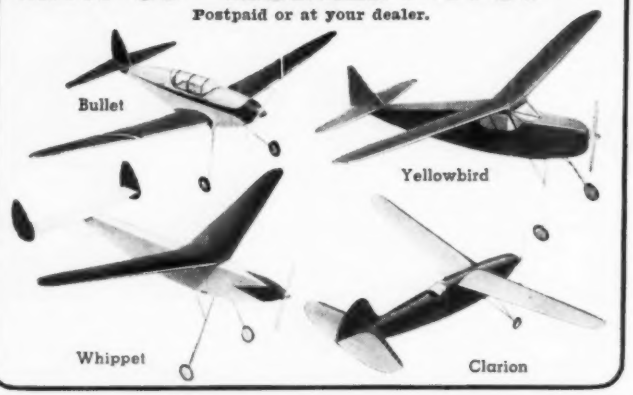

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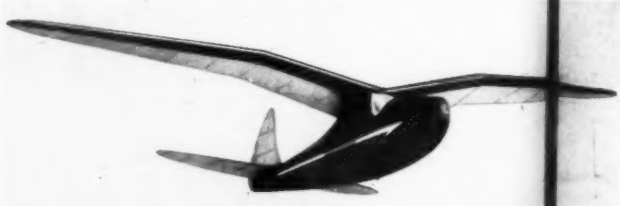

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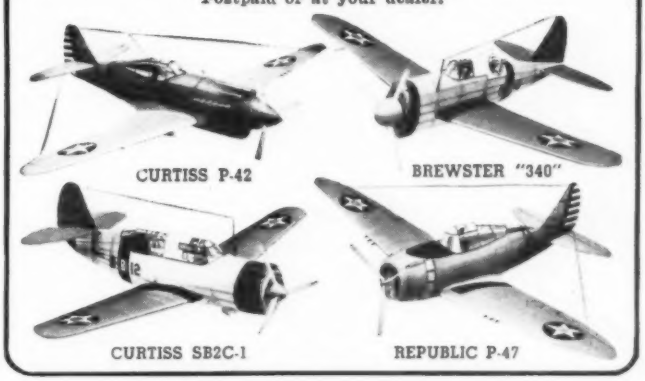

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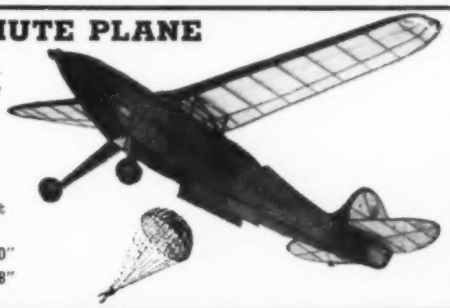

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planes with very successful results.

One of the war's most striking examples of versatility and all-around efficiency has been provided by the Douglas A-20 twin engine attack bomber. The British have used it as its American designers intended originally that it should be used: as a tree-top attack plane.

It was with this airplane that American Army Air Forces pilots on July 4th, made the first AAF raid on the European continent. One of the group, Major Charles C. Kegelman, was forced down on the De-Kooy airdrome in Holland with one motor shot apart, the tail assembly riddled with bullets and other damage. He caromed off the runway again at 275 miles per hour, tearing a gaping hole in the fuselage but got the ship into the air, blasting two anti-aircraft towers at the edge of the field as he did so and came home safely.

Recent sweeps by the Douglas Boston version of the A-20 have included 16 against power stations, 10 against German airdromes in occupied countries and 26 against industrial targets. In these 52 raids, in spite of the concentrated anti-aircraft defenses and German fighter protection in the areas raided, only one Boston failed to return.

In the Middle East Command A-20 Bostons have been used against fighter-protected motor transports and airdromes. A total of 191 sorties have been reported during which hits were scored on motor transports and enemy aircraft on the ground and one enemy fighter, which was destroyed in the air. In these total operations, only one Boston is missing.

A British official report from Libya states that two South African Air Force Boston Squadrons have flown more than 1,500 sorties (one plane making one flight is a "sortie") between May 23rd and July 9th. On July 7th their first aircraft was lost to enemy fighters since the beginning of the campaign.

On August 6th, according to a press communique from General Stilwell, United States bombers with fighter escort attacked an airdrome outside Canton, destroying several enemy aircraft on the ground. Japanese Zeros then attacked, two of which were shot down and another was destroyed by the rear gunner of a B-25 bomber, all with no American losses.

Another press communique from General MacArthur's headquarters tells of a 900-mile daylight raid from Australia against Jap airdrome facilities on New Britain Island during the course of which the bombers were intercepted by 20 of the new-type Zeros. The bombers successfully completed their missions and, in a wild fight, shot down seven Jap planes and damaged others with the loss of only one bomber.

Uncle Sam's wings are spread 'round the world and these are the stories, typical of the strength, daring, and courageous skill of his flying nephews. They're in action everywhere, every hour of the day and night, flying against the enemy's best and beating him: in the air!

VICTORY

Tops in Props

(Continued from page 23)

peller of improved design.

Carving technique is gained from experience. However, the proper background of how and when to do certain operations will aid a great deal. The first thing to do is cut the propeller outline from the blank. A band-saw is the best thing to use: a knife does the same job only takes a bit longer. The hole should be put in the hub to accommodate the shaft. This is best done on a drill press, but a piece of wire carefully run through the hub is satisfactory.

Now we'll start carving! For best results use a very sharp knife honed to a long tapered edge similar to a straight razor. Don't try to use a straight razor—it won't work. The blade should be about 3" long and the cutting edge straight except near the tip where it curves to the point.

The undercamber is cut in first so the correct amount of undercamber can be established. Then the uppercamber can be carved, making the blade as thin as structurally possible. If the knife blade is used to cut in the directions and positions shown, no trouble should result from splitting and utmost accuracy of cutting will be accomplished. By holding the blade at the illustrated angle a natural undercamber will result. However, if you prefer a highly undercambered blade section extra precautions must be taken in carving. A curved sanding block will work the best to obtain extra undercamber and also smooth out irregularities on the surface too fine to be removed with the knife.

When the undercamber has been cut in, sanded very smooth and both blades have been checked for symmetry, we cut the blades to the proper outline or shape. Carefully cut one blade to a pleasing, efficient shape. You will find that leaving on or cutting off an extra 1/32" can entirely change the propeller's appearance. Use a piece of writing paper and a sharp pencil and make a template of the blade shape, check the template against the blade and then transfer the outline to the unfinished blade as illustrated in sketch No. 4.

Now we can proceed with the uppercamber. Again observe the direction and angle of the knife blade travel on certain portions of the propeller blade. Sketch No. 5. It is while carving the uppercamber that the tapered crossection or gradually diminishing blade thickness is obtained. Care should be exercised not to carve the blade near the hub too thin nor the tip too thick; a good propeller has rather flexible blades, yet strong enough to absorb normal shocks.

Blade thickness is also dependent upon the hardness of the wood used. Wood for a propeller should run between 8 and 12 pounds per cubic foot in weight. The harder the wood used the thinner the blades. Try to obtain a thin trailing edge, tapering all the way from the highest portion of the blade section. Refer to the typical blade section shown. Finish the propeller by sanding smooth, finally using ten nought polishing paper. While sanding occasionally check for balance. Do this by running a pin through the shaft hole and then supporting the propeller by placing one end of the pin on the ball of the second finger and the other on the end of the thumb.

Finally we're ready to put a hinge on the propeller. There are many ways of making a hinge, and several that are very meritous. Here we outline a few advantages of the type illustrated. One method of making a hinge includes putting an angle on the axes of the hinge which takes the axis out of the perpendicular with the shaft. That is not necessary to make the blades fit flush against the fuselage, so on this hinge the axes will both be perpendicular to the shaft, but will not be perpendicular to the center line of the propeller (an imaginary line drawn from tip to tip through the hub. The angle to use is shown on the layout of the hinge piece. Use 1/32" brass or dural to make the hinge fitting. Making the main hinge fitting in one piece has the advantages of being: 1. More rigid; 2. More easily kept in alignment while assembling; 3. Furnishes a thrust plate for the thrust bearing; 4. Offers more gluing area to assure its permanency.

The soldering lugs shown are used in place of wire as used on some types of hinges because they offer better gluing surface and are more easily bent to exact shape.

The first step is to cut grooves in the rear of the propeller hub to accommodate the hinge fitting and brass tubing. Glue the fitting in place. Place the lengths of brass tubing through the holes in the hinge fitting. Now cut portions of the prop away so that the lugs will be inlaid; this not only strengthens the hinge, but aids in fairing the hinge into the propeller. When all lugs are glued in place, and dry, solder the ends of the brass tubing to the soldering lugs, being careful not to overheat the lugs and blister the glue. Place the shaft in its hole and glue it in place. Finally bind with strips of silk—or cover with pieces of silk. Either method is acceptable. Cover with several coats of glue. Sand smooth and coat with glue again.

The propeller is now completed except for its finish. If a super finish is desired,

mix thin dope and pure powder of talc (10c a pound) to a consistency of honey. Rub it into the pores of the wood with the finger. When dry, sand down to the bare wood again. Thin out the wood filler and brush on a thin coat. Sand this down almost to the wood with fine polishing paper. Now it will take about three *thin* coats of colored dope to finish the job, polishing lightly between coats and rubbing the last coat with rubbing compound or simonize cleaner.

Now comes the crucial moment, cutting the propeller so the blades can swing free. Use a wafer-thin razor blade and cut right through. Don't worry if the blades swing a bit stiff at first because they must be worn down by a few minutes vigorous movement of the blades followed by the application of some oil. Dope (with matching color) the exposed ends of the blades.

Now that the propeller is finished the problem is: Will it fold properly? The answer is yes, if the rubber tensioner is fool-proof and if the hinge angle is correct. A sample nose block and rubber tensioner are shown. This type has been used quite a good deal and works very well.

The best way to make sure that the fuselage and propeller form a good streamlining team is to make the propeller first and fit it on to the fusleage while it is under construction, so some minor changes in fuselage contour can be made to assure a minimum of drag in the glide.

It is possible to build a fold-back propeller and body to match so well that when folded the propeller and fuselage have no more drag than the nose of a soaring glider. Naturally this means a spinner and enclosed tensioner must be used. Even the nose block must be tailored to fit.

There is a time-worn, time-proved adage familiar to us all:

"Spend time on your model, and it will do time for you."

VICTORY

Sky Scouts

(Continued from page 17)

Acosta writes from Apartado No. 4 Farcia Aguilera, Banes Orte, Cuba. He says he is extremely interested in aviation and is taking a number of courses from schools in his country; he also reads many of the American aviation reviews.

Now he wants to be a Sky Scout and sends in his first application. We note, however, that he doesn't send in the list of planes; to become a Sky Scout he should do this as soon as possible. A list of planes containing the twelve sets, one published each month, should be sent to Sky Scouts, MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York City.

One of the questions Acosta asks, and asked also by a number of others is: "Do I have to pay any money?" The answer is: No. MODEL AIRPLANE NEWS is trying to render a service that will be helpful to the defense of this country and others involved in war. Through the Sky Scouts we ask you to serve also.

From Rio De Janeiro, Brazil, we hear from Harry August Benford of Rua Maria Quiteria 23 Apt. 2. Mr. Benford is president of the Royal Air Force Model Airplane Club of Aviation. He says: "All the members of my club are very active and desire to know if we can become Sky Scouts to

help defend America." Certainly, and the organization feels greatly honored to know that aviation enthusiasts in other countries wish to join hands in a mutual effort to eliminate our enemies. Mr. Benford continues:

"As you probably know, the danger of being attacked by air is as great in this country as it is in the United States of America, and it would help the civil defense of this country very much if some of the Brazilian boys and girls knew how to spot enemy planes. If we may enter the organization, I am quite sure that all the members of the club will be very glad to send in a list of the planes published by the M.A.N."

Apparently from Mr. Benford's letter the magazine has not been reaching many readers in South America; this has been due to war conditions and the government has forbidden a number of issues to be sent out of the country to prevent information getting into enemy hands that may prove of value to them. Such issues will not be available to readers outside of the United States until after the war. Those who have missed a number of the Sky Scout lessons because of this may refer to the series when they are reprinted, starting with the February issue.

Apparently Paul Rintrona's activity in the Sky Scouts has prompted a number of aviation questions. We will take time out here to answer them.

Question: Do the props on a twin motor model both turn counter-clockwise?

Answer: No, one turns clockwise and the other counter-clockwise. Usually the tips turn outward at the top.

Question: What are the top speeds of the P-40 Kittyhawk and the Japanese Zero? What is the wingspan of the Zero?

Answer: The latest Curtiss P-40 model, the Kittyhawk, has a top speed of about 390 mph. The top speed of the Zero, according to the latest information, is 315 mph. The span of the Zero is approximately 36 ft., the same as the Kittyhawk.

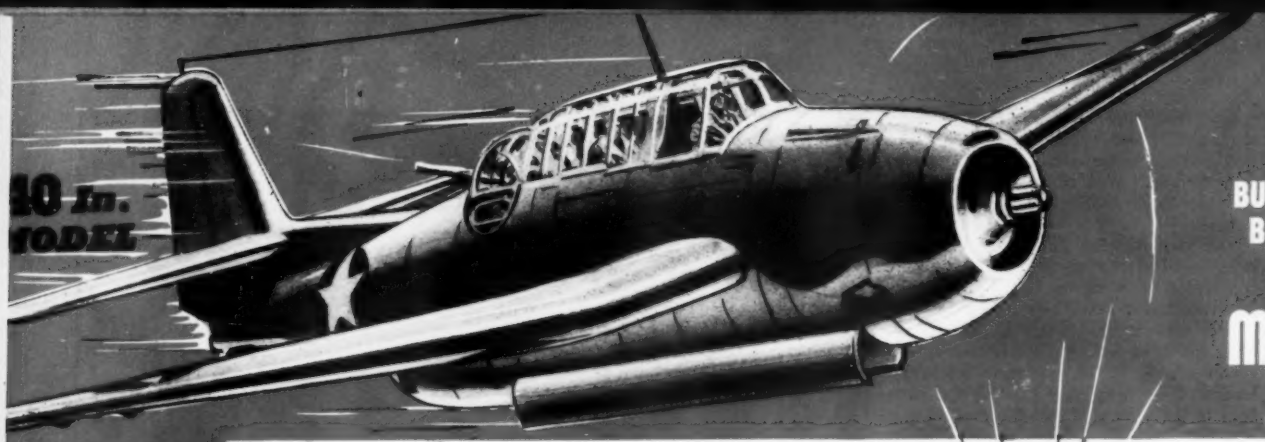
Question: What is the fastest plane in the world and what is its speed?

Answer: The fastest plane known at the present time is the Lockheed P-38. There may be other faster ships which are being developed and of which we have not as yet heard, but the P-38 is the fastest one in actual service. It has been credited with a speed of 450 mph.

A number of members have asked if one set of answers can be sent in for each unit. This is not permissible, inasmuch as each spotter will become more familiar with the silhouettes and their names by sending in his own answers.

Sky Scouts who wish to make themselves proficient in spotting planes should not fail to read article 6 of "Modeling Your Future in Aviation," given on page 8 of the December issue of MODEL AIRPLANE NEWS. This gives a system with sufficient information to enable you to spot planes easily and quickly. You will find it a great help in spotting ships to examine any one of the silhouettes after covering up its name, inserting its characteristics in the table in the proper spaces, and then from this data endeavoring to determine the type of ship and its name. After a little practice

(Continued on page 40)



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A Message from Joe Ott, Pilot, Instructor, Engineer and America's Foremost Model Airplane Designer.

This business of building and flying model airplanes is more than just a hobby, for the fascination of putting parts together and the thrill of seeing your handiwork z-o-o-m off skyward under its own power is only part of the picture.

America's vast army of model airplane enthusiasts represents the spirit, and power and drive of American Youth at its best. These boys and young men are serving their country well because they are shaping their own careers and the models they build and fly are the stepping stones to the important places they will fill in days to come. Just as sure as twice two is four, these are the fellows who will be the pilots, engineers, designers and technicians of tomorrow.

I have seen this happen so often. In my twenty years in model work I have met thousands of model fans. Most of them are "grown up" now and are really giving an account of themselves. You'll find them in the Army and Navy Air Corps; in commercial aviation; in America's great airplane factories. When I see what these fellows are doing now it makes me proud that I knew them when their ships were the kind of models you fellows are flying today.

Keep on with your model building, fellows! Keep on with your studies. Uncle Sam needs your best effort just as he needs the best we older folks have to offer. Keep building 'em . . . Keep buying war stamps . . . KEEP 'EM FLYING.

Joe Ott

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Use only the best model builders cement for it costs no more. Ask for Joe Ott cement in the red, white and blue tubes. Packed in Ott-O-Former Kits and sold separately everywhere.

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$1.39
45 INCH WING SPAN
GENUINE DELUXE KITS
Lockheed Interceptor
Spitfire Pursuit

$1.00
40 INCH WING SPAN
WORLD BEATING
DOLLAR MODELS
Mustang Vultee Vengeance
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75c
38 INCH WING SPAN
NEW BOMBER SERIES
Vought-Sikorsky
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MOST POPULAR "FIFTY CENTERS"
Airacobra Lockheed Interceptor
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27 INCH WING SPAN

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UNBEATABLE VALUE
Messerschmitt Spitfire Pursuit
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BIG SHIPS—LOW PRICE
Spitfire Mustang
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by following the same procedure when spotting airplanes they may be easily recognized.

Every Sky Scout should study this article carefully. It might be of great help to cut out the silhouettes and paste them on your bulletin board where they will be available to all unit members.

VICTORY

Air Youth

(Continued from page 23)

Officer, NACA, Langley Field, Va., or to Mr. W. R. Howell, U.S. Civil Service Commission, Fort Monroe, Va.

Among the famous model aircraft builders now working at Langley Field are Dick Everett, winner of the recent Victory Model Airplane Meet held in Washington, D.C.; W. Hewitt Phillips, noted model aviation designer, and scores of other prominent aeromodelers. In all, it is understood that several hundred "ex" and active model airplane experts are busily engaged in vital war work for NACA.

Model Industry Awards for Sanctioned Meets

Through the generosity of members of the Model Industry Association, special awards are available for Academy sanctioned meets. These M.I.A. awards have been made up in the form of first, second and third place medals suitable for presentation in any type of competition. The M.I.A. medals which were especially designed and executed, come in three types—gold for first place, silver for second, and bronze for third. The first place medal has a distinctive blue and white ribbon, second place a red and white ribbon, and third place, a yellow and white ribbon. The medals bear the Academy insignia in relief on a background of blue enamel and the inscription "MIA AWARD" on the back to show that it is the gift of leading members of the aeromodeling industry.

While the number of medals available is limited, it is expected that these special M.I.A. awards will be available for some time. Applications for a set of the medals must be made to Academy headquarters by the contest director in charge of a sanctioned competition.

NAA Academy of Model Aeronautics Embarks on Aggressive Wartime Program

The NAA Academy of Model Aeronautics, the governing body for model aviation in America, has inaugurated a wartime program to keep aeromodeling on the upswing and pointed toward greatest usefulness in the nation's pre-flight aeronautics training plan.

A.M.A. headquarters in the nation's capital announces that among the new plans of the Academy is recognition of a new type of power-model competition, control models; a national election of officers by mail ballot; and greater recognition for the builders and fliers of rubber models.

In a precedent-setting session, officials of the A.M.A. have agreed, in response to many requests, to recognize control model flying. The only reason that this step has not been made previously is that this type of activity which is also known as G-line flying, tether flying, and U-control flying, has been expanding so rapidly that it would have been practically impossible to set up the machinery of servicing the activity and licensing control model flights.

The Academy will issue special control model fliers' experimental licenses to all over fourteen years of age who pledge themselves to conduct their activity in a safe and sane manner and along educational and scientific lines.

Those who do not hold an A.M.A. license at the present time may obtain both a free-flight and experimental control license for the fee of $1. The license fee includes a set of decals in any size the modeler desires.

In the matter of regulations, the will of the model flier will prevail as long as the need for safety at all times is not overlooked. Complete instructions as to how

to vote or submit suggestions to the Contest Board will be made available to control model fliers when they receive their licenses.

To encourage greater interest in rubber model flying which is the most popular category for the younger enthusiast, Academy officials have revealed that "license" numbers will be issued to novice modelers specializing in rubber powered craft, just as is done for the more experienced gas model fliers.

Effective as soon as possible, the Academy will issue license numbers to rubber modelers. The modelers will be requested to paint or affix cut-out numbers to the wings of all their planes which fit the official Academy rubber model categories. Each license number will be followed by the letter "R" to designate that the craft is rubber powered.

It is expected that sets of decals will be available at a cost of ten cents each, postpaid, and will consist of the prefix A.M.A. the license number, and the letter "R."

Election of A.M.A. Officers

An election by mail ballot of Academy officers for the coming year is being arranged by headquarters. A president, secretary-treasurer and one vice-president from each of the eleven A.M.A. districts will be chosen by leader members to head up the organization for the coming year.

Usual practice is to hold elections in conjunction with the annual national championship model airplane meet. With all such contests cancelled "for the duration," it has been necessary to resort to voting by mail.

Air Youth Scholarship Awards

Eleven American youths who distinguished themselves through their knowledge of aeronautics and building of model airplanes have been awarded scholarships to aviation schools by the Air Youth Division of the National Aeronautic Association, it was announced today.

The winners are Charles W. Epps of Athens, Ga., Leonard L. Sherman Jr. of Hillsboro, Ore., Adrian L. VanderLinde of Kalamazoo, Mich., William E. Haynes of Oklahoma City, Okla., Charles A. Willits of Superior, Wis., Charles Roderick Jr. of New Bedford, Mass., John E. Kuether of St. Paul, Minn., Slack W. Winburn Jr. of Salt Lake City, Utah, Wesley Kirchoff of Mesa, Ariz., Richard Adams of Ashland, Pa., and Royal T. Perry Jr., of Greenwich, Conn. and William M. Johnson of Chicago, Ill.

Several hundred youths in 35 states between the ages of 15 and 21 years applied for the scholarships, Maj. Lester D. Gardner, chairman of the Air Youth awards and director of the Institute of Aeronautical Sciences, said.

The winners were selected on the basis of their outstanding ability and workmanship in building model airplanes, certification by their school principal of their scholastic achievements in mathematics, trigonometry, algebra, physics and chemistry, and the contents of a 1,000 word essay on "The Part Youth Can Play in America's Air Defense."

In addition to Major Gardner, the awards committee fo rthis second annual competition was composed of Charles H. Colvin of the Daniel Guggenheim Aeronautics School at New York University; William R. Enyart, vice president of the National Aeranautic Association; Roy G. Fales of

the New York State Education Department; Charles G. Grant Editor of "Model Airplane News"; Parker Leonard, president of the Soaring Society of America; Dr. E. E. Oberholtzer, superintendent of Schools, Houston, Tex.; Dr. Alexander J Stoddard, superintendent of schools, Philadelphia; and John B. Walker of United Air Lines and Herold M. Harter, National Secretary of the National Exchange Club.

Dr. Robert W. Hambrook of the United States Office of Education assisted the committee in its judging.

Winners will be assigned for courses of their choice at the following aviation schools: Academy of Aeronautics at La Guardia Field, New York; Aero Industries Technical Institute at Los Angeles; Boeing School of Aeronautics at Oakland, Calif.; Case Jones School of Aeronautics at Newark, N.J.; Delehanty Institute at New York City; Embry-Riddle School of Aviation at Miami, Fla.; International Correspondence Schools of Scranton, Pa.; Luscombe School of Aeronautics at West Trenton, N.J.; and Spartan School of Aeronautics at Tulsa, Okla.

VICTORY

Air Ways

(Continued from page 20)

Unquestionably many readers of MODEL AIRPLANE NEWS are expert aeromodelers and are qualified to assist in the program, so you are urged to contact the Academy of Model Aeronautics, 1025 Connecticut Ave. N.W., Washington, D.C., or your local schools and other organizations now developing aviation education programs, and offer your assistance. Many teachers are seeking instruction for themselves in the methods of model airplane construction and flying. Contact them—if you can help them you will be making an extremely important contribution to the national effort of teaching aviation fundamentals to all American youngsters.

No group in the world is better qualified to do this job than American expert aeromodelers, so here is your chance to enlist the knowledge gained from your hobby, in the service of your country. An idea learned from aeromodeling, expressed in the classroom, may save the life of some pilot fighting the enemy on the other side of the world. This is well within reason because at this moment Uncle Sam's pilots, who once were model builders, subconsciously make use of this knowledge in every maneuver executed in combat—Get Busy!

Under the impetus of the interest created by the Navy's solid scale modelbuilding program, many young men are carrying their model activities beyond the program's requirements and are building all sorts of unique and beautiful scale models. Tom Riccardi of 537 W. 105 St., Los Angeles, Calif., submits a photograph, 1, of one of his recent jobs—a Lockheed P-38 built with all external details and decorated with combat camouflage. The light portions of the craft are light sky blue, darker portions are olive drab. The craft has regulation British insignia and has a wingspan of 13".

Due to Army restrictions of free flight gas models in many localities hundreds of model builders have turned to U-control

flying; that is, flying gas models at the end of a wire or string. The pilot, controlling the ship from the ground, can operate the elevators by twisting the hand, if two wires are used, the ends at the ship being connected to bell cranks operating the elevators. The pilot end of the wires are hooked to the end of a short stick. When this stick is grasped in the hand and twisted one way or the other, by movement of the wrist, tension on one of the two wires is brought to play, thus operating the controls as the model circles about the pilot on the ground.

This makes it possible to fly various types of craft in small space. It also gives the modelbuilder the thrill of controlling a high speed plane, for many of these ships travel 60 to 70 mph and require great skill to maneuver the craft off the ground in flight and to land them without crackups.

A beautiful U-control scale model, displayed by its builder, C.T. Travis of 4004 Avenue Q, Birmingham, Ala., is shown in picture 2. It is a Bell Airacobra. The fuselage is hollowed out from balsa and is mounted on a wing with built-up frame.

Picture 3 shows the model with the cowling removed. The unique installation of the engine may be seen; like the large craft it is located directly over the wing, the propeller being driven through an extension shaft 7-1/2" long.

Another U-control job is shown in picture 4, built by Dwight McSmith of Dayton, Tenn. He says it performs beautifully powered with an Ohlsson "19" or "23" motor and is the second of this type he has constructed. The sturdy landing gear placed well forward helps to prevent it from nosing over on landings and thus protects the propeller.

Picture 5 shows a Howard Douglas with a wingspan of 4', built from a $1 kit by Wilfred Hendrickson of 1152 Avenue C, Bayonne, N.J. He says he has not very much time to work on models but he managed to build this ship by spending 15 minutes each night on its construction. When finished it was supposed to be powered with rubber, but after painting it, Hendrickson says, he has been considering putting a small gas motor in it. He would like to hear from some modeler who could give him some idea of how to place the engine, coil and batteries.

The model has been flown several times with rubber and flew well, especially when powered with only 10 strands of 1/8" flat rubber, which, Hendrickson says, was not nearly enough to make it go places. It was interesting to note that Hendrickson says it flew well with only 10 strands and wonders why it would not fly better with more. This prompted a careful examination of the plane's pictures sent to us, which revealed a possible answer to this situation.

When planes are equipped with propellers which are too small, having too little blade area, they often fly better with less rubber than with more. More rubber causes the propeller to merely churn the air with no effect. So we advise Mr. Hendrickson to change propellers if he wishes a really fine flight from his plane. If he will carve a propeller with about twice the blade area of the one shown, and with a helical twist to the blades instead of a straight pitch, he will find that efficiency will be doubled.

NICE WORK

TESTORS

Camouflage finishes. 8 official Air Corps colors and thinner. Waterproof, quick-drying. For solids or on doped surfaces. Plus 25c pack. and postage. **$1.00**

BOOKS FOR MODELERS

Model Aircraft Handbook. 300 pgs., 100 illus. By Wm. Winter (Air Trails); Model Airplane Design. 528 pgs., 205 illus. By C. H. Grant (M.A.N.); Aerodynamics for Model Aircraft. 257 pgs. By Aurum Ziev; Building & Flying Model Planes; Youth in Aviation (Program manual for leaders & Contests); Model Airplane Contests. (Official rules, etc.); How To Get A Job In Aviation. 96 pgs. By C. F. Matoon (Curtiss-Wright).

SKY-KOIL

Light, sturdy spring-type motor unit. Delivers 200 prop. revs. Complete, ready to install (easily transferable), weighs less than 1¾ ozs. With plans for lightweight, easy-to-build model (by mail, add 10c).

X'acto

Finer, cleaner, faster, accurate model-work.

No. 82—Fitted wooden chest, 3 handles, 12 blades $3.50; No. 62—Double-Set, 2 handles, 12 blades, $2.00; No. 1—X-acto for delicate work. Handle and blade, 50c; No. 2—For heavy carving. Handle and blade, 50c (Replacement blades, each 10c).

SILKSPAN

American-Made Tissue.

GM (Gas Model). White only, 24" x 36". **3 25c**

OO (Rubber). White only 20" x 24". **6 20c**

TISSUE

OO (Imported-type). Yellow or Red, 20" x 24". **10 for 25c**

HILLCREST TIMERS **$1.25**

HILLCREST "Dethermolizer" Timer **75c**

NUTS

In Technicolor

Streamlined "propspinner" complete with nut, for A, B or C motors, 20c each.

SKYWAY-ALL-METAL KNIFE! For delicate or heavy duty! Handle and 2 edge blade (by mail 15c) **10c**

IGNITION WIRE, 5' 20c; Hi-Tension Lead (with clips), 15c.

GIANT SIZE CARVED FUSELAGE ONLY SANDING NECESSARY

Carved hard-wood fuselage saves 4 to 6 hours' work! (1) BELL AIRCOBRA (17"), $2.50; (2) CURTISS P-40 (16½"), $2.50; (3) RYAN STM-2 (17"), $2.50, (4) BREWSTER-BERMUDA (17½"), $2.50; (5) GLOSTER GAUNTLET (17½"), $2.50; (6) GRUMMAN F3-F2 (15"), $2.50; (7) HAWKER-HURRICANE (17½"), $2.50; (8) N. A. BT-14 (20"), $2.50; (9) BOULTON PAUL DEFIANT (20"), $2.50; SPITFIRE (18"), $2.50; CURTISS HAWK "75" (16"), $2.50 (9) Messerschmitt ME-109 (16"), $2.50; LOCKHEED HUDSON (16½"), $2.50 (1) STUKA DIVE BOMBER (22½"), $3.00; (4) LOCKHEED P-38 (20"), $3.50 (includes carved booms and fuselage); WESTLAND-WHIRLWIND (22½"), $3.50 (includes carved motor nacelles and fuselage).

STANDARD KITS

Any of above BURKARD KITS in standard form (cut-to-outline shape fuselage instead of carved) available. Each kit—regardless of price—contains cut-to-outline shape wings, rudder, stabilizers. Leading and trailing edges tapered where necessary. Aluminum cowls, where specified. Cement, dope, insignia, wheels, full size plans, celluloid for cockpit, prop material, metal gager for cockpit detail.

Limitless selection of all standard makes. Unless otherwise indicated, solid kits contain "cut-to-outline-shape" bodies, tail and wing surfaces, decals, insignias, full size plans, ½" scale—50c. JAPANESE ZERO, RUSSIAN STORMOVIK, LOCKHEED P-38 (Lightning), GRUMMAN WILDCAT, NO. AMER. MUSTANG. Also: B-J SEAPLANE, CURTISS P-40, STUKA DIVE BOMBER, CURTISS DIVE-BOMBER, GLOSTER GAUNTLET and DOUGLAS ATTACK, ½" scale—35c. BOEING P26-A, HAWKER HURRICANE, HAWKER FURY, HAWKER P6-E, CURTISS P-37, SEVERSKY P-35, NO. AMER. BELL P-39, MESSERSCHMITT, SPITFIRE, HEINKEL, DEFIANT, RYAN PT-20 4 for $1.50 SOLIDS. NO. AMER. APACHE, CURTISS KITTYHAWK, SPITFIRE, GRUMMAN WILDCAT, JAP ZERO (Individually, by mail, 45c).

METAL COVERED REPUBLIC SOLID

Moulded fuselage, scale model. Metal covered with no detail missing. Rivet-reproduction included IN SCALE! Kit is complete in every respect, including motors, prop, cockpit covering, wheel pants, etc. (by mail, add 25c for packing, postage). **$2.75**

IDENTIFICATION MODELS

Complete selection of foremost producers: Joe Ott "Identoplanes," Comet Official Identification Models, Megow's "Spotter" Planes.

SQUADRON INSIGNIAS

Send 3¢ stamp for illustrated listing of hundreds of JACO decals. U. S., United Nations, Enemy Squadron insignia, numerals, etc. Save as you order from this list.

GAS ENGINES

Super ATOM

A limited quantity remain. No more "for the duration" when these are gone! Lightest Class "A" engine ever perfected, weighs less than 2 ozs. with plug and condenser. Develops highest power-to-weight ratio! 9,500 RPM, .092 cu. in. displacement. Complete with plug and condenser. **15.50**

ATOM

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Designed for flight with Atom, by America's foremost modellers!

HAYMAKER $1.50

Simplified monocoque design. Removable nose unit. 33" span. 165 sq. in., 4 ozs., $1.50.

STARLING $1.95

Wing ribs, tail parts, fuselage sides and bulk heads die cut. Finished prop.

BABY PLAYBOY $1.00

America's favorite $1 gas model (can be flown rubber-powered!) 33" wingspan.

PIPER CUB COUPE $1.95

Miniature of America's best known sky "flivver", detachable wings.

ITSY-BITSY $1.00

Unique design, brilliant flying "Parasol" polyhedral wing and wheel gear.

Rogers

R. M. C-2 ..... $ 9.75
"29" 14.00
"35" 14.50

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BEE "B" $1.95

For Class "B" or "A" events. Strong, rugged. Semi-monocoque fuselage. 48" span. Weighs 19 ozs. (with Ohlsson).

MIKE $1.49

1st small ship in gas model history. Originally $4.95. 48" span.

"JAP SLAPPER" $2.00

Interlocking plywood formers, gussetted joints. Newest "B" 42" span.

ZOMBY $1.95

The semi-stunting successful Leon Shulman 44" span flyer!

CORONET $2.50

One of the large "B" models, deluxe kit 46" wingspan.

ENSIGN $2.95

Sleek, trim high-wing flyer. 41" span, 34½" overall length.

AMERICAN ACE $3.95

Henry Struck's 54" wing-span flyer, featuring "New Ruler" theory.

PLAYBOY (Jr.) $2.50

As easy to construct as a "Wakefield" model! Good "B" beginners' model.

Class 'C' Plane Kits

Super-Quaker—5' 4" span, $4.50; PACER "C" (National Champ), $4.95; FLAGSHIP—78" wingspan, $4.95; (DeLuxe FLAGSHIP), $6.95; MERCURY—72" span, $4.95; Playboy, Senior 80" span, $3.95.

GLIDERS

For those modellers who have turned their interest and attention to interesting glider-model work, we suggest one or more of the following: CONDOR $1.00; EAGLET 50c; JAVELIN, DART or ARROW 25c; Burd's Glider 39c. (By mail, postage should be added.)

40" PIONEER

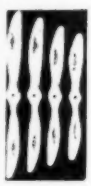
ALL SHEET BALSA FUSELAGE

Streamlined monocoque. Makes up into an ideal contest-duration, flying model! Kit as complete in every respect, including finished, propeller, wheels, cement (Silkspan OD Tissue). Full size, crystal-clear, construction plans.

30" RUBBER FLYER

The rubber-power models which are sweeping the nation because of their "trued-outline" silhouette, magnificent flying performance and multi-Stringer construction. Choice of 6 models: Vought "Corsair", Grumman Wildcat (27" span), Curtiss "Warhawk", Douglas "Devastator", North American "Mustang" and Supermarine "Spitfire" (by mail, add 15c) **65c**

$1



FOLDING PROPS

9", 10" and 11"

ZIPROPS

8" to 15" each 25c

Clean, smooth, glass finish. Delivers a fast high climb with minimum slip. Perfect "aerodynamical" design and guaranteed absolute uniformity, making replacement, if necessary, a matter of seconds with no readjustments necessary.

PURSUIT AND GLIDER SQUADRON

Interesting "dogfight" "combo" 19" rubber-power pursuit plane with folding wing catapult interceptor-glider. Ready to fly—both $1.

DYNA-FLASH COIL

Super-efficient coil for Plane, Boat, Race Car (A, B or C motors). Quick start, low drain, lightweight (1⅞ oz.). Unconditionally guaranteed. $2.75; POLK "ECONOCOIL" delivers a fast, hot spark. For A, B and C engines, fitted high-tension terminal and lead, $1.00

POLKS

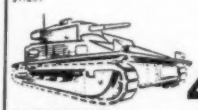
AND YOU *Can* GET IT!

JEEP

50¢

MOVABLE WHEELS AND WINDSHIELD

The busiest little vehicle in Uncle Sam's "mechanized" army—and the most popularized! Makes up into a handsome, super-detailed replica. Kit includes cut to size parts, all necessary hardware, turned wheels with full-size plans and construction pointers. Nothing omitted, not even transparency for windshield! Scale: ½" to foot! (DOUBLE-SIZE JEEP, $1.25)



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MOVABLE TURRET — **¼" TO ½" SCALE**

Models of tanks which have made "their name" in front line action! Semi-finished bodies, cement, color and easy-to-follow plans in each. Choice of 8 different types; U. S. Williams, Amsco or Liberty; Canadian Vickers; Greek Carden-Loyd (Amphibian); Swiss Reggi-Ansaldo, British Whippet, Anzac Hornet. ALL 8 FOR $2.00 (by mail, add 30c postage) or any 4 for $1 (plus 20c postage).

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FAMED "EXPENDABLE" BOAT!

The most "gallant" fighter-craft ever developed! The "David" that slew many enemy "Goliaths"—and has written a glorious page in the naval history of the U. S. Our "Ship Dept." features several different kits of this history-maker'. Each is complete, including carved hulls, necessary accessories and full size, crystal clear plans. 13" length $5.00; 12½" length $2.50 (others for $1.00 and 50c).

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The boats which are defying enemy marauders to deliver "lifeblood" to distant military posts. A varied selection, including "Esso" TRENTON, makes up into 17¾" finished model. Finished hull with all necessary materials for superstructure, fittings, etc., $3.75.

128 PAGE ILLUSTRATED BOAT BOOK

Above and many other models, 10,000 fittings, supplies, accessories featured in newest boat book (pocket size). Send 25c (coin or stamps) for copy which contains 25¢ CASH-VALUE COUPON.

DOOLING 12" PEE-WEE

A THUNDERBOLT for SPEED!

Scoop sensation from America's leading race car maker! Features entirely new transmission system. Has turned better than 20 m.p.h.! Last word in simplicity, designed for all small motors. Assembled, only **16.95**

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Delivers 44/100 hp., or 4½ pounds thrust at 8500 R.P.M. 45/100 cu. in. displacement. Famous "double compression" feature—piston rings plus lapped-in-piston. $18.50

$18.50

(Sold only with DOOLING Race Car Above)

HURLEMAN

BIG CARBURETOR $3.50

Made integral with (1¼ oz. capacity metal tank. Easy to take apart for cleaning. Designed for large bore motors and midget racers. Increases R.P.M. up to 1500 "turns."

MEDIUM $3

¾ oz. tank made integral with carburetor. Speeds up R.P.M. Easily taken apart for cleaning. Use upright or inverted.

AIR-O-TRAINER

Model with Movable Controls! Helps you learn fundamentals of flying. Ailerons, rudder and elevators move exactly as in real plane. (Fashioned after famous BELL AIRCOBRA.) Entitles you to illustrated booklet "Flying Ground Course", $1.50.

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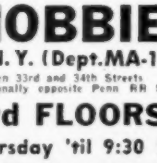
A COMPLETE CAR IN A KIT!

The most practical, most convenient car-kit idea ever perfected! Everything to build a complete "O" gauge unit is right in the kit, right in place. Merely add the trucks for your line, and you're ready to go to it! Special bolster for mounting Lionel Trucks included.

OPEN END COMBINE AND COACH
CLOSED END COMBINE AND COACH
PASSENGER also BOX or REEFER

All parts cut-to-size: Clip-together wood bodies, die cast end sills, formed steps, painted, scribed, lettered sides (visit or write for types available), scale dummy couplers, ice-hatches, brake-wheel, platform, and staff, grab iron (every unit included exactly as specified in easy-to-follow construction plans).

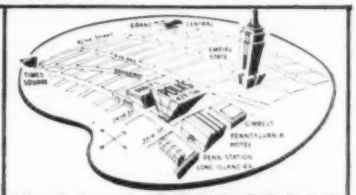
*REEFER or BOX CAR $3.75
(Choice 42 Different Sides)
PASSENGER (EITHER TYPE) $3.95
NOTE: Prices do not include trucks



GAS ENGINE

Airplane Catalog

New edition features latest items! Many tested "alternate" items! Send 5c (coin or stamps) for your copy and be "up-to-date" on today's availability as prepared for you by POLK'S.



Modelers' SHAN-GRI-LA

The "happy hunting grounds" for modellers—in every field!—is this "nation's leading supply source!" Long before the current "shortages" developed we filled our retail salesroom, stockroom and warehouses with enormous supplies! The walls and shelves are literally "bow-legged" under the sag of their combined contents! It's safe to predict that almost any item you may require for your project, if at all available, is probably on hand!

IF IT'S ADVERTISED! IF IT'S GOOD! IF STANDARD MAKE!—POLK'S HAS IT!

Of course, a short while ago we would have "let the above ride" without a single reservation! However, in view of today's situation—you might make this slight change: If it's NOT HERE, it's likely there is none anywhere! So, as a time-saver for you, we suggest you try us first—ON ANY NEED IN THE HOBBY FIELD! (Incidentally, consolidating orders assures economies in delivery costs!)

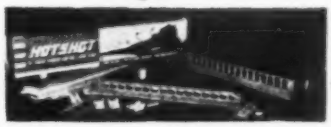
SYNCRO JIG SAWS

Cuts ¾" wood and thin metal. Adjustable guides. Just what you need for pine and basswood.

$14.75

Express Charges Collect

SENIOR



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15. A group of Aeronuts who participated in the Chicago Championship Contest

Thus more rubber can be added and the length of flight and climb will increase proportionately. For a gentle climb the propeller blade area should be equal to at least 1/10 the wing area; for a steep climb, 1/6 of the wing area. The area of the propeller on the ship appears to be no more than 1/20 of the wing.

Mr. C. J. Cleaver of Olympia, Wash., sends us a picture, 6, of what he calls "a hashed-up affair of Sal Taibi's Hornet which appeared in MODEL AIRPLANE NEWS about 2 years ago." Though it is only half the size of the original model the performance is comparable to it. It is powered with a Bantam engine which swings a 11-1/2" prop. Mr. Cleaver is a member of the Olympia Miniature Aircraft Club; he says, however, "our club is not here any more, except in spirit. All of the members are on defense jobs or else are taking civil pilot training." Cleaver has just finished his secondary pilot's training and is now applying for cross-country work. He continues, "I hope to resume my model flying after this mess is cleaned up."

If scale model builders wish to see a real piece of work look at picture 12, showing a replica of Al Williams' Grumman Gulfhawk, constructed in spare time over a period of 2 years, by Douglas Leek of 92 Lucille St., Hempstead, N.Y. This is more than a model; it is actually a miniature full scale aircraft containing all the details of the large ship. It embodies features such as retractable landing gear and tail wheel, made of sheet aluminum, aluminum tubing and a few watch screws. Ailerons, elevators and rudder are operated from the cockpit. The wing lights, tail light and landing light all operate from a two cell flashlight. The landing light also retracts flush into the wing. The cockpit hatch may be opened and closed. All rivets on the big ship are simulated. Cabane struts, "X" struts and exhaust outlets are of chrome plated brass tubing.

A fine finish was obtained by the usual method of first sanding and then rubbing down several coats of dope with a rubbing compound and waxing to a high gloss. There are many other visible features of the model not mentioned by Mr. Leek, such as the propeller hook. Here beautiful workmanship is evident.

Picture 13 shows a unique little gas model, the GE Cabinette, plans for which appeared in the June 1942 issue of MODEL AIRPLANE NEWS. This model was built by Bob Kramer of 586 Central Ave., Needham, Mass., while he was convalescing from an appendicitis operation. It was ready to fly in two days after its keel was laid. Kramer says that on the first flight it climbed like a rocket to a high altitude and finally glided back to earth undamaged. It is quite a small plane, having a span of 36", and is powered by an Atom engine. In spite of its unusual performance it is of simple construction and easy to build. Kramer remarks that it is a swell design and sends his compliments to Private Frank Ehling.

In picture 9 we see Charles Williams of 3807 Branch Rd., Flint, Mich., with his modified Zipper at a contest held last summer at Battle Creek. Williams has been a licensed pilot for 2 years but in spite of this has not given up model flying, but instead finds it contributes many helpful ideas to his work in full scale aviation.

In spite of intensive war activity, civilians, shop workers and Army model builders have found time to hold flying contests. It is surprising that so many contests have taken place during the last few months; regular weekly meets have been held in a

number of communities. An especially active group is the Pioneer Gas Model Club of Denver, Colorado, who held an A.M.A.-sanctioned contest on Oct. 11th. Though it was not attended by a large crowd, real performance was displayed by all of the planes.

First place was won by our old friend, Charlie Bristol from Wyoming, picture 8; an adult model fan with many years' experience in the game. He also received $15 for unusual performance. Second place, carrying an award of $10, went to Bruce Cambell of Denver; 3rd place, $5, to Harry Cambell. The club always takes moving pictures of its contests, so as to have an interesting and complete record of activities during the year. These are loaned out as the club sees fit. We are indebted for this news to Dick Ekrem, Club Publicity Chairman.

Next you see proof that workers in the airplane industry still are active with models. The Curtiss-Wright Corp. employes of the St. Louis plant have organized the Curtiss City Aero Club and have regularly scheduled meets. The club recently held two contests; trophies being awarded for the greatest number of points scored in the contest.

Ted Klotz was the star performer. He won the Gas Event with his trim little ship shown in picture 11.

He is shown holding the 10-1/2" sailplane with which he won the Sailplane Trophy in picture 7.

Klotz's gas model is typical of perfect aerodynamic design. You will note that the fin area is comparatively low and small, giving spiral stability; the thrust line is quite high, preventing stalls and a steep climb. His gull wing sailplane is not only an excellent flier but a beautiful piece of workmanship.

Trophies will be awarded at a special club meeting to be held soon.

The Northrop Model Airplane Club is another model organization within one of our large manufacturing plants. On Sept. 27th it held its second club contest at Rosecrans & Western Ave. A large assortment of planes was on hand. Earl Metzger stole the show with an excellent flight of 10 min. 45 sec., establishing a new club record.

A group of contestants is shown in picture 14: Earl Metzger, the winner, stands second from the left. The club will hold a scale model contest soon; models will be on display from Dec. 15th to 22nd, and winners will be announced on the 23rd. They expect soon to form a women's division of the club, as many have applied.

It is evident that models are rapidly being taken out of the class of "toys" and are being used to increase the knowledge of flight science by serious-minded worker adults. This we hope will shock the general public into a greater realization of their value, for in the past, through lack of knowledge on the subject, they have considered them merely "playthings."

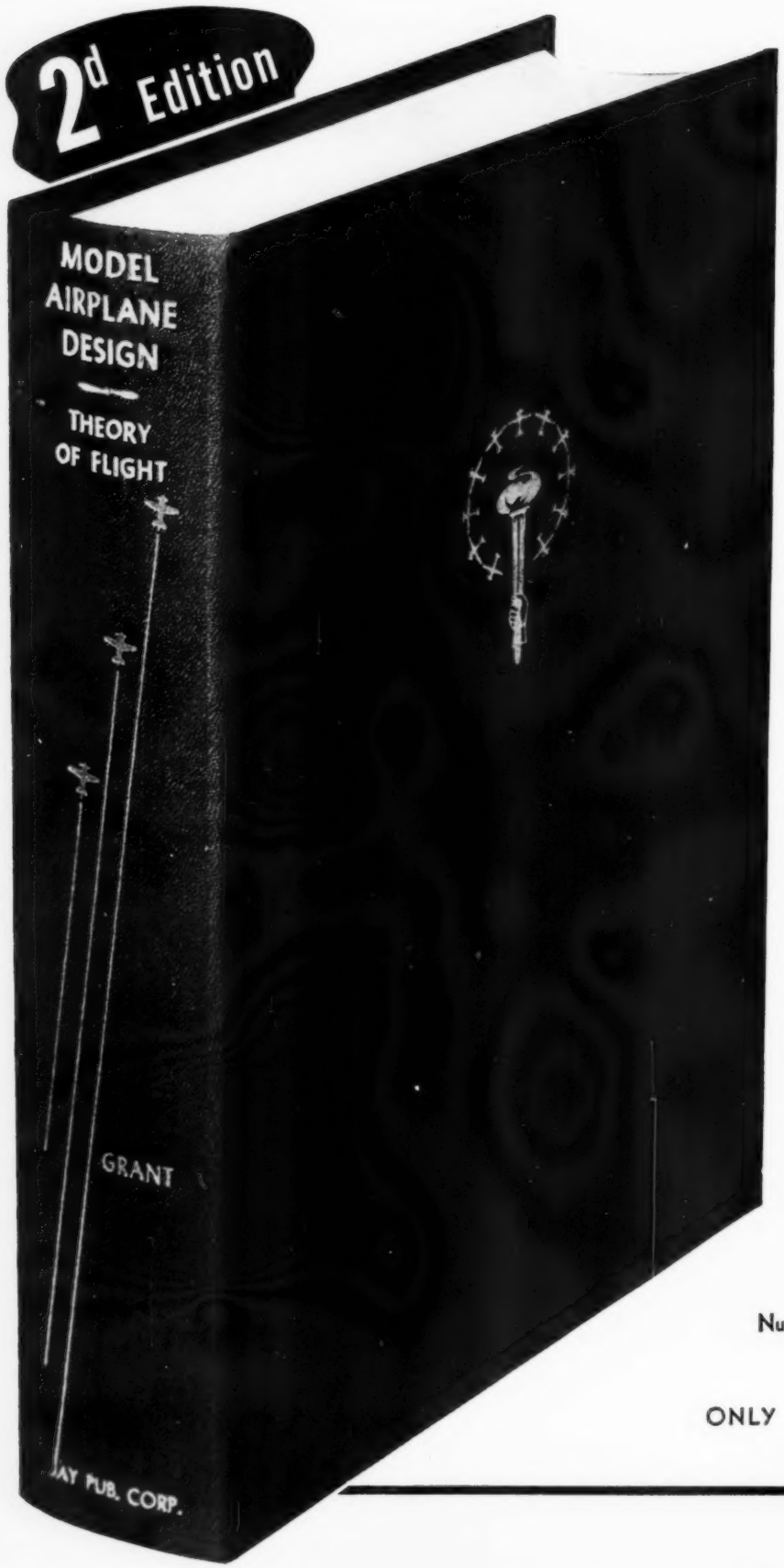
Washington, D.C.

Charles T. Weiss of 508 St. N.E., Washington, D.C., was Contest Director of one of the largest meets ever held in this community. The contest, sanctioned by the Air Youth division of the N.A.A., was held on Oct. 11th at the White Oaks Field, Md. Over 2000 fans were present, and contestants came from Virginia, West Virginia, Maryland, southern New Jersey as well as Washington. Out of the approximately 200 planes participating only 22 crashed and 10 were lost. Dick Everett won the grand award, a handsome trophy contributed by Rep. Jennings Randolph of W.Va., as well as a $50 war bond. Everett won the Class A Event, his ship remaining in the air 5 min. 20 sec.; and his rubber job flew for 8 min. 33 sec. The winner of the second grand award was William Pennoyer whose ship, which won the Beauty Contest, boasted of 13 coats of paint. Two 18-year-old youths, William Borncheur and Bruce Jennings, tied for the third grand award.

Many notables were present, including Gill Robb Wilson, president of the N.A.A.; Mrs. Paul V. McNutt, Mrs. E. Swift Newton, head of the National Board of Girl Scouts; Capt. Charles Crowford of the British Air Commission, and many others. Co-sponsors of the meet were: Women's Auxiliary Air Youth, Capitol Model Aeroneers and Silver Springs Aeronauts. Besides the grand awards many other prizes were donated by leading model manufacturers and magazines.

Boston

One of the most active clubs in the world, especially at the present time, is the Boston Traveler-Jordan Marsh Junior Aviation League. Within this club is another club—the Balsa Hawks of Boston, a selected group of experts. Picture 10 shows them with some of their ships at a recent outing. Left to right, they are: John



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The Author—Charles Hampson Grant

received his training at Princeton Engineering School and Massachusetts Institute of Technology which led to designing U. S. army ships in World War I. His glider experiments and work with large planes as early as 1911 earned him a coveted membership in the "Early Birds." For over 20 years he has been the world's foremost model flying authority, and for the past twelve years Editor of MODEL AIRPLANE NEWS—all of which is reflected in this, his life's work.

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—At what angle to set the stabilizer.
—How big to make your plane . . how much power it should have.
—What size propeller to use.
—How to calculate blade area.
—How much rubber to use in a motor for any given weight.
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Midwest Contests

In two consecutive Sunday meets the Desplaines Sky Wolves, the Gas Model Aeronauts and the Times Air Cadets climaxed the Midwest's outdoor season with championship contests and the awarding of traditional trophies. Outstanding and consistent winners of firsts throughout the past season were Milton Burley, undisputed champion of A, B and C Gas Events; John Bock and Melvin Melichar sharing honors for outdoor rubber events, and the U-Control wizard and ace, Russ Webber.

At the annual competition held on September 13th, for the Midwestern States Championship Trophy sponsored by the Gas Model Aeronauts, 150 modelers from 4 states competed in an Open Class Gas Model Contest. Tom Anderson, flying an original design powered with a Forster "29," carried a high time of 8:37 as his model hovered over the Chrysler Aviation Plant at the site adjoining the Chicago Model Airplane Airport. Runner-up, with an Ohlsson "19" power plant in an original design, was Harry Schroeder with 3:23.9. Duane Weber placed third with this Phanton Special, with 3:17.1.

A fine example of model aviation's contribution to the war effort was the "Fly for the Navy" U-Control contest, sponsored by the Desplaines Sky Wolves, on September 13—at Earle Field, in Desplaines, Ill. Charles J. Hein, Secretary of the Sky Wolves and noted aeronaut, offered to the Navy Department the facilities of the model airplane club to assist in the recruiting of 2000 Naval Flying Cadets for the Ninth Naval District. Lieutenant J. Smith Ferebee accepted the invitation and expressed, for the Navy, that model aeronautics is a basic step in the education of American youth and the value it is to the model builder, should he desire to serve his country as a Naval Flying Cadet. "U-Control Flying," he said, "is a great forerunner in the development of skill and control for the future pilot and contributes materially towards qualifying him as a Navy Pilot."

To the free flight model builder it may seem that tether flying should be a "snap," but according to Howard Aschburner of Riverside, Ill., who won the Championship Trophy by scoring 95 points with a single ship, it was no picnic. Although he scored less than the 99 points that Ken Flagler of Desplaines tallied in the Precision Landing Event, Howard carried the crown of victory when Ken Flagler had to bring in a second ship to complete his official flights.

A dodo prize consisting of a basket, whisk broom and shovel, was presented to every contestant who cracked up his model. The unfortunate entrant would keep the trophy until the next crackup, when appropriate ceremonies were conducted and the prize changed hands.

Classes in the Speed Event were the same as are used in the Academy sanctioned meets. Al Klippert of Desplaines placed first for a book of War Stamps in Class A with a speed of 43.5 mph, having been the only contestant to successfully compete official flights with one ship. A consistent winner in every U-Control contest, Russ Webber of the Gas Model Aeronauts, carried away the first prize trophies in the Acrobatic Event with 87 points, and the B & C Speed Events with a speed of 59.5 mph and 52 mph, respectively. Runner-up in the B & C Speed Events was Jack Barnes, Chicago, who placed second for both classes with speeds of 59 mph and 52 mph. Likewise, a dual place winner was Robert Friske of Harvey, Ill., who ran third in the B Speed Event with 50.5 mph and 68 points in the Precision Event.

The greatest event on the outdoor calendar was the traditional Chicago Championship Meet for rubber and gas models, held on September 20, sponsored by the "Chicago Daily Times," and conducted by the Chicago Park District annually at the Model Airplane Airport. Under the direction of Herb Bart, Assistant Supervisor of Craft of the Chicago Park District, who recently succeeded Steve Meuris, the meet was skillfully handled with excellent facilities for the convenience of the hundreds of contestants.

In winning the Chicago Championship Trophies, Milt Burley accumulated a total time in one event of 22 min. 2.5 sec.; and John Bock, 13 min. 2 sec., both of whom were awarded $25 war bonds. Winners, seconds, and third placers in other events were awarded books of war savings stamps. Winners and their respective times were:

Class A Gas: Milton C. Burley, 602.5; David Williams, 482.4; Frank Liska, 427.6. Class B Gas: Milton C. Burley, 505.2; Tom Anderson, 503.7; Jules Carrett, 419.6. Class C Gas: Ed Ceisel, 496.8; Jack Procunier, 437.10; Jules Carrett, 426.5. Junior Outdoor Stick: Dick Campbell, 466.3; Melvin Melichar, 417.6; Bill Reagan, 380.4. Senior Outdoor Stick: Bill Melichar, 466.0; John Bock, 421.2; Dave Steinberg, 386.0. Junior Outdoor Cabin: Robert Denton, 502.5; Charles Pitelka, 416.0; Melvin Melichar, 352.5. Senior Outdoor Cabin: Ray Good, 455.8; Art Beckington, 455.7; Joe Vermoch, 429.6.

The situation of indoor flying and suitable sites for contests in the past year has been very dark. The National Guard Armories have been heretofore closed to indoor model builders because of the merge with the regular Army. Lieut. Maurice Roddy, Intelligence Officer of the Illinois State

GRUMMAN F3F1
U. S. NAVY SHIPBOARD FIGHTER

32" Span. Length 24". 1" Scale

A fine detailed model with retractable landing gear, 4" turned balsa motor front, 3 oz. grey dope, ½ oz. yellow, 2 oz. glue etc., all parts printed on balsa, 10" propeller, wheels, rubber motor, full size drawing, and all parts. This fighter plane is wheels, full size drawing, and all parts. This fighter plane is used in large numbers on the aircraft carriers. Const. Set complete, postpaid **$3.75**

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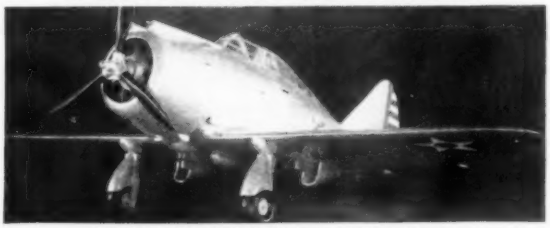

32" Span. Length 25". 1" Scale. Color, Silver

Set has 4" turned balsa motor front, 10" carved prop, balsa wheels, tail wheel, rubber, all parts printed on balsa, 3 oz. silver dope, ½ oz. black, 2 oz. glue, etc., insignia, and full size scale drawing. New improved model has retractable landing gear and movable controls from cockpit. Set, postpaid **$3.25**

NEW MARTIN B26 U. S. ARMY BOMBER

40" Span. Length 35". ⅝" Scale. Color, Silver

A beautiful model of the world's fastest bomber. Set has all parts printed on balsa, propellers, wheels, insignia, 4 oz. silver paint, 1 oz. black, motor fronts, full size scale drawing, and all parts to build. Construction set, postpaid **$4.75**

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NEW BELL P39 AIRACOBRA U. S. ARMY FIGHTER
34" Span. Length 29". 1" Scale

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All illustrations shown here are actual photos of our finished models. Due to the defense requirements, it may be necessary to furnish harder wood than balsa for some of the parts. We ask your co-operation.

BOEING B-17 FLYING FORTRESS BOMBER

44" Span. Length 30". Color Silver. Weight 6 oz.

THE MOST SENSATIONAL EXCLUSIVE BOMBER SET IN THE WORLD

Set has all parts printed on balsa, four 2" special finished motor fronts, four 4" carved props, celluloid wheels, set of paints, glue, and full size drawing. Set, postpaid **$4.50**

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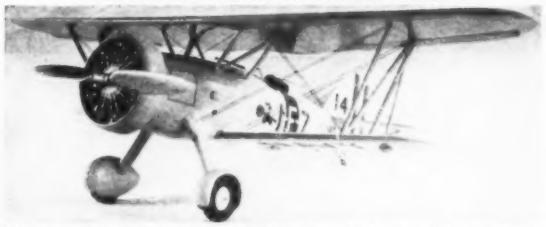

32½" Span. Length 22¾". 1" Scale. Weight 6 oz. Color grey, top wing yellow

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9 Foot Span. Length 66". 3" scale

MODEL ¼ SIZE OF REAL PLANE. CAN USE RADIO CONTROL.

One of the easiest gas models to build. Has special wing airfoil for slow landings. Set has ready cut wing ribs, gear struts, nose piece, etc., set of paints, dope, glue, etc. Model weighs 3¾ lbs., without motor, suitable for radio control. Lifts 4 lbs. additional weight. Full size scale drawing. Const. set, postpaid, less wheels and motor **$15.00**

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14" Span. Length 11¾". ⅜" Scale

This and our F11C4 are the finest solid sets in the world. Set has completely finished balsa fuselage, turned spinner, routed out cockpit, paints, glue, insignia, wheels, drawing, etc. Wings, tail and rudder cut to outline. This Masterpiece set, postpaid **$2.50**

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Large 6" photos of latest models, gas models, motors, etc.
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22½" Span. Length 14½". ¾" Scale

Set has 5" celluloid motor, 3¼" tapered aluminum cowl ring, set of paints, all parts printed on balsa, drawing, etc. Set, postpaid **$2.95**

CURTISS F11C4 SOLID MODEL

10½" Span. Length 7½"

Set has completely finished balsa fuselage, cockpit cut out, wings cut to shape, 1⅛" deluxe cast motor, alum. cowl, 3 bladed cast prop, paints, drawing and all parts. Set p.p. **$1.75**

MINIATURE AIRCRAFT CORP.
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Militia, recently announced that meets have been scheduled and arrangements will probably be made for the use of such places in the near future. With this good news the recent loss of the International Amphitheatre to the Quartermasters Corps, which caused a slowdown of indoor model building in Chicago, will again be a stimulating factor for increased activity.

Picture 15 shows John Sommers, Harry Schroeder, Duane Webber, James Webber, Henry Polson, Jules Carrett, Stanley Kowalcyk of the Gas Model Aeronuts who participated in the Chicago Championship Outdoor Meet.

Notices

Don Richardson lost his Atom powered gas job at Creedmore, Long Island, New York, on Oct. 12th at about 7:30 P.M. It was an American Ace covered with white fabric. He will gladly pay a reward for its safe return. Anyone finding it please communicate with him at: 80 Woodruff Ave., Brooklyn, N.Y. Phone number is IN. 2-3158.

Raymond Cumming of 432 Clark St., Helena, Mont., reports the loss of his red and orange Ohlsson powered Zipper which flew out of sight from the Helena Flying Field after 30 minutes. (Incidentally, the flight was made with only a 10 sec. motor run.) The motor number is 14371. Will anyone who finds this ship please notify Mr. Cumming?

VICTORY

Japan's Flying Coffin

(Continued from page 19)

to chest. Only conjecture can answer the question of whether or not all Zero pilots are so taped or whether this particular Japanese pilot was recovering from some sort of chest or back wound or sprain.

However, the plane was disassembled, crated and shipped to North Island Naval Air Station, San Diego, for analysis and test. Although requiring considerable reworking, the plane was found to be in such a state of repair that it was decided to assemble and actually fly it. Orders were issued and the Zero was stripped from stem to stern to determine any minute strains or breaks in her structure which might render her unsafe for flight. Those found were repaired, the engine was overhauled and, with the aid of some careful fabrication of new parts, the Zero was put back into shape and preparations made for the first test flight. Lieut. Commander E. R. Sanders was ordered out from N.A.S. Anacostia, for the test. A veteran test pilot-engineer, a native of Marion, Illinois, was graduated from the U.S. Naval Academy in 1930 and became a Naval aviator two years later. He has served as an instructor at N.A.S. Pensacola, Florida, and in the flight test section at Anacostia.

The little fighter, trimmed in regulation Navy grey and marked with the good ol' blue-and-white star of Uncle Sam, ambled across the field and pulled up at the head of the runway. All traffic was halted and every eye on the base was on the trim little ship as Sanders cautiously took her aloft. After several flights during which corrections were made, the veteran test pilot finally gave her the gun and set out to find exactly what she would do. And find out he did!

The Mitsubishi OO is an entirely conventional airplane for its time resembling, in many respects, the Vultee Vanguard, (Model Airplane News, May 1940 issue) or the Focke-Wulf Fw-190 German fighter (Model Airplane News, November 1942 issue). It is a low-wing all metal monoplane with completely retractable landing gear and fully enclosed cockpit for the single pilot. Wing is full cantilever, built as an integral part of the fuselage, contrary to American practice of building the wing in sections for ease of assembly and service in the field. The ailerons are quite large, permitting only a comparatively small flap area at the trailing edge. Wing tips fold about two feet inboard for purposes of carrier-deck stowage, lending credence to the belief that Japanese carriers have fairly narrow decks and crowded stowage spaces.

The landing gear is a single strut, full cantilever design with a spacious tread and a workmanlike fitting and structure at its upper end. It folds inboard along the wing leading edge and a pair of large doors cover that portion of the wheel exposed.

Retraction is hydraulic; wheels are equipped with hydraulic brakes. A good quality rubber is used throughout, which might follow from the fact that the Japanese now control 70 percent of the world's rubber producing area!

The fuselage is long and symmetrically tapered with cockpit located high and well forward. The powerplant and cockpit are mounted close forward and aft of the main wing spar, causing a highly desirable concentration of weight near the center of gravity.

Tail surfaces are spacious and beautifully designed, the rudder being exceptionally large. Stabilizers are carefully tapered and are of all metal full-cantilever construction. The rudder and elevators are all metal, fabric covered. No controllable trim tabs are provided although a small fixed tab is mounted on the trailing edge of the rudder near the bottom controllable on the ground only. There are no alternate loadings for the Zero and due to the good concentration of its weight over the c.g. there are no large moments to be balanced out, particularly in flight, thereby eliminating the complicity of controllable trimming tabs.

The engine is a Mitsubishi A-14 double-row radial air-cooled design which develops approximately 900 hp. maximum. The engine is a distinct copy of the British Armstrong-Siddeley Tiger VII which the Mitsubishi firm has, for some time, held the license to build. It is interesting to note that this engine, as manufactured by the British some years ago, developed 920 hp., whereas the Mitsubishi copy is only capable of 900 hp. Contrary to statements pub-

lished elsewhere the engine bears little resemblance to any American make although the three-bladed all-metal constant-speed propeller is a distinct and efficient copy of the famous Hamilton Standard model. The entire propeller cone is encased in a huge, elliptical spinner covered with a thin layer of rubber which effectively prevents the formation of ice.

The carburetor is of the up-draft variety, the air being taken in from a duct mounted on the bottom of the nose ring cowl from which it is routed aft and up into the carburetor. The oil cooler is mounted aft of the carburetor air duct below the engine cowl and is simple radiator type without controllable gills or shutters.

The skirt section of the cowling mounts eight sections of engine cowl cooling flaps in an annular ring. These flaps are manually operated. Powerplant section is cramped and the engine mount ring is extremely short, making for a concentration of weight. The oil cooler is mounted atop the powerplant section and is a welded aluminum container strap mounted.

The pilot is fully enclosed in a sliding hatch which moves rearward for ease of entrance and exit. The fairing immediately behind him is completely glassed to provide adequate vision in all directions. Flight controls are entirely conventional consisting of a ring-grip elevator and aileron control column and two rudder pedals which are also used for braking purposes. The instrument panel is a simple design containing only bare essentials: airspeed indicator, altimeter, tachometer, oil and engine thermometers and fuel and oil pressure gauges. The electric control panel contains a variety of switches and an ammeter. These switches control instrument panel lights, navigation lights, gunsight and fire-control interrupter gear, cannon firing solonoids and solonoid-operated hydraulic actuating valves.

The Japanese have, oddly, not stinted on radio equipment, there being a complete transmitter, receiver and a radio direction-finding loop and receiver. The direction-finding loop is mounted within the pilot's enclosure aft of the cockpit and the antenna mast is mounted further aft projecting up and through the enclosure fairing.

Fuel is carried within the wing panels aft of the landing gear in conventional welded aluminum alloy tanks. Many Zeros operating both in the Solomon and Aleutian region have been fitted with external jettisonable fuel tanks built of moulded plywood. The total fuel supply is something like 280 gallons which is sufficient for a range of a little less than 1,000 miles.

Armament aboard the Zero is comparatively heavy for a ship of its size. Two 7.7 millimeter machine-guns are mounted in the nose just forward of the cockpit, geared to fire through the propeller by conventional interrupter gearing in which a lug on the propeller shaft trips the guns' firing cam when it is lowered to the lug by the pilot's trigger switch. Ammunition is mounted in boxes mounted within the fuselage. Doors alongside each gun provide access for loading ammunition and charging the guns on the ground. These machine-guns are approximately .303 calibre or equivalent to our .30 calibre guns which are no longer used on American pursuit planes, and on some medium and heavy bombers only as auxil-

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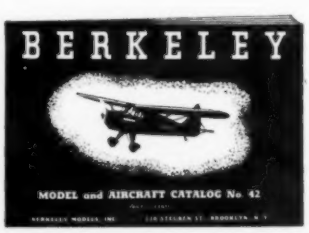

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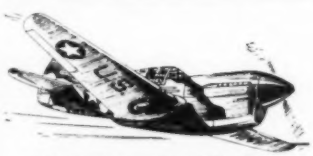

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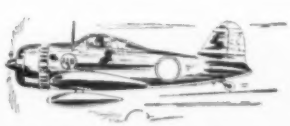

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iary guns. This gun has a rate of fire of approximately 1,000 rounds per minute.

A 22-millimeter cannon is mounted in each wing panel just outboard of the landing gear support fitting and these are weapons to be reckoned with. These guns have a rate of fire of approximately 4,600 rounds per minute and fire explosive shells weighing a little less than one pound each. These shells are extremely long range and are either of the deadly explosive type or conventional armor-piercing or ball type. Ammunition is carried on prone chutes within the wing. This cannon is approximately equivalent to the deadly American 20-millimeter cannon with the single exception of its having a considerably lower muzzle velocity which, in the final analysis, is an index to the fire power and hitting power of a shell-gun.

The gunsight is a good copy of the American or British electric gunsight which is fairly accurate over short ranges. The type, however, is no longer used in either of the Allied services, having been replaced by several superior designs.

The Zero has a wingspan of 39 ft. 5 in., is 30 ft. 3 in. in overall length, making it approximately the same overall size as the Curtiss P-40 Tomahawk or Kittyhawk fighter (MODEL AIRPLANE NEWS, February 1942 issue). Gross weight is 5,200 pounds, making it one of the most remarkably light fighter planes ever to take the air. Engineers throughout the world have marveled at this extremely light weight from whence the Zero derives its rapid climb. Its secret lies in its lack of heavy armor, parachutes and its structural simplicity, making for ease of production, maintenance and operation, but making it also vulnerable to faster and sturdier Airacobras and P-40s.

And here are the things Lieut. Commander Sanders found out about the Zero's behavior in the air. At around 200 mph. the Zero is an extremely maneuverable airplane, light and sensitive on the controls, a "sweet" ship to fly, he reports. At this speed, normal combat speed for the Zero, it can hold its own with any ship of comparative dimension and horsepower, and at this speed it is at its best. At about 225 mph. the Zero controls begin to stiffen up (due to large control surfaces) and it is no longer capable of the fast rolls and quick climbing turns which has made it the menace it once was in the Pacific theatre of operations. In a vertical dive at around 380 mph., the Zero developed a distinct flutter which warned of light construction and, if continued, renders the airplane completely unmanageable.

In straightaway level flight, full throttle, the Zero airspeed indicator just barely bounces against the 300 miles per hour mark. This top speed, a figure about which we have heard so many wild rumors, definitely relegates it to inferiority as compared with the known super-high top speeds of latest American and British designs.

The Zero is capable of comparatively high altitude operation and squadrons have appeared over Port Moresby above 30,000 feet, higher than the old style Curtiss P-40s were able to fly and fight effectively, although this service ceiling will be no problems to later types of American fighter planes, notably the Lockheed P-38 (MODEL AIRPLANE NEWS, May 1939 issue) and Republic P-47 Thunderbolt (MODEL AIRPLANE NEWS, December 1942 issue) interceptor pursuit planes.

Certainly the Zero is a dangerous weapon with its deadly cannon and high maneuverability at comparatively slow speeds. But

under the merciless pounding of modern American fighter planes with their heavy, rapid-fire cannon, high speed and high altitude maneuverability, the Zero will prove to be a "flying coffin" to every "Jap" in its cockpit. It will be quickly and completely driven from the Pacific and with it will go its guiding hands and the treachery and slavery which they represent.

VICTORY

Modeling Your Future In Aviation

(Continued from page 16)

indicated.

The frame is now completed except for the landing gear. Cut out the struts from 1/32" balsa sheet, two pieces for each strut. These are cemented together to give the struts strength. Two wheels are required; each is composed of two sheets of 1/32" balsa and one of cardboard, cut to the correct diameter and then cemented together with the cardboard between the balsa sheets.

When dry, punch a hole for the axle through the center with a pin. The axle can be made from an ordinary pin. First put the wheel on the pin, then force the pin through the lower end of the strut at the proper point. Then bend the pin upward and cement it in place to the outside of the strut. Smear a little cement on the inside of the strut and at both sides of the wheel where the axle passes through. Then set it aside to dry without disturbing it.

When the cement is thoroughly hardened twist the wheel to free the cement so it will turn on the axle. When the two struts with wheels are completed the strut is cemented to the outside of the middle rib of each wing. To do this cut a small wedge-shaped block from bass or cigar-box wood. This is glued to the side of the rib at the point where the struts are to be glued in place, with the sharp point of the wedge downward and the broad edge cemented tight to the wing covering above and its side to the rib. The upper end of the landing gear strut then is cemented to this block. The assembly may be held in place firmly with small clothes-pin clamps.

Be sure not to omit the wedge-shaped block from the assembly, for this serves the purpose of forming a vertical surface so that when the landing gear is cemented to it the struts will also be vertical. You will note that the rib face is not vertical due to the wing dihedral. If it is cemented to this directly the landing gear will toe outward.

Now all frame parts are complete, ready for the covering. Each part is covered separately with medium heavy white letterpaper. This serves as a base for realistic decorations and gives the model added strength. First trace the pattern of the fuselage on the paper, drawing all the decorations in black ink. When you have completed it to your satisfaction cut out the tracing of the body side and cement it to the wood body framework. The second side may be made and applied in similar manner.

The top wing covering is traced next. Draw the outline, inserting decorative details as indicated on the wing drawing. Then cut it out and cement it to the upper surface of the wing, being sure that it is flush with the leading and trailing edges; trim if necessary. The underside is made and applied in the same manner. At the tip, however, the small overlapping ears should be bent around the edge and cemented in place.

The stabilizer is covered with only one sheet glued to its upper surface; the fin should be covered on both sides. Fig. 67 shows how the upper covering is applied to the upper wing surface.

Now you are ready to assemble the little ship. Fig. 68 indicating how this is done. First cement the wing into its recess in the bottom of the fuselage, holding it in place by cementing the lock strip in beneath it. This is pressed up firmly against the underside of the wing to insure a tight joint and may be held with clamps while the cement is drying.

Adjust the wing so it forms equal angles with the body on both sides. Then cement the fin to stabilizer, trimming off the lugs that pass through the stabilizer so they are flush with its underside. When completed, cement the whole unit in place on the upper rear edge of the fuselage. Use pins to hold it in place until the cement is dry.

Your airplane now is beginning to look very realistic and only a few more operations are required. The whole ship should be sprayed with a light coat of dope and color decorations added if you desire; your fancy may dictate this procedure.

However there is one more operation: inserting the nose weight which should not be done until the airplane is complete with decorations. This weight is to give the ship proper balance. Adding decorations after it is inserted may throw it out of balance and result in poor flights. Proceed to balance the ship as follows:

Attach temporarily a small finishing nail or other piece of cylindrically shaped metal at the nose and see if the ship balances in a horizontal position when supported on the tips of two fingers at a point under the wing 30% from leading edge. Add or reduce the weight until the balance is perfect, then cover this weight with cement and insert it in the nose-weight slot.

If it is desired a small launching hook may be fastened to the lower edge of the fuselage at the nose, as at LH on the drawing. To do this make a hole in the wood with a pin and then cover the end of the wire hook with cement and force it up into the hole. Also cover the hook with cement where it contacts the fuselage. When the cement is thoroughly hardened your little model is ready for flight. The flight procedure is the same as given for the bird glider in article 3.

VICTORY

Flash News

(Continued from page 2)

be eliminated when the new wind tunnel at North American Aviation's Inglewood, Calif., plant is completed. Even with all schedules carefully planned to give equal opportunity to all test engineers, overloaded conditions at wind tunnels in the Southern California area have made it important to expand these vital research facilities. Engineers have had to wait weeks or even months for their turn at testing, and again any subsequent tests required by changes in the original model. Airspeed in the throat of the new tunnel, which has been designed so that air will flow through it in straight lines without eddying or burbling, can be raised to 327 mph.

The aircraft carrier Bon Homme Richard, now under construction, has had its name changed to Yorktown to commemorate and carry again into battle the famous name of the illustrious "York" which sank in the Battle of Midway. It thus becomes the fourth American naval vessel to carry this traditional fighting name.

An odd international moral, if not political, situation has arisen over the recent acceptance of a detachment of the Naval Aviation of Fighting France, a group of Free French aviators, by the United States Navy for training at Navy instruction schools. The fliers will use American planes and equipment and, upon graduation, will make up an all-French unit to go back into action against the Nazis.

The extensive operations bases, equipment and personnel of Pan American Air Ferries, Inc., a division of gigantic Pan American Airways, which has pioneered the construction of bases in South America and Africa, has been absorbed by the Air Transport Command of the Army Air Forces.

The American Eagle Squadron in the Royal Air Force has been transferred to the Army Air Forces. Major General Carl Spaatz, commander of the United States Air Forces in Europe, has accepted all three Eagle squadrons into his command and thus comes to an end another glorious chapter in the annals of America's fighting fliers.

The Southern California aircraft industry is now producing a total of 25 different and distinct models of fighters, bombers and training planes for the Army Air Forces and the Royal Air Force, et al.

News of a "new" German fighter has reached this country. The Messerschmitt Me-109G has appeared in action over the skies of beleaguered Stalingrad, the newspaper "Red Star" has announced. According to that source the 109G is powered by a 1,700 horsepower engine which gives it a speed of 250 miles per hour at 3,000 feet and 325 miles per hour at 12,000 feet. Although these figures are not particularly impressive it must be borne in mind that the plane carries three cannon and two machine guns in addition to vastly improved armor plating for the pilot and fuel tank. This great weight addition has slowed the 109G down considerably from the earlier models. The "London Daily Mail" states that the 109G is also designed for high-altitude operation and is capable of operating above 40,000 feet. At latest reports, this new ship has not appeared in the skies over Western Europe.

Lieut. General George H. Brett, Chief Air Officer to General Douglas MacArthur in the Southwest Pacific theater, is now in this country touring various aircraft factories and training centers to "tell everyone who will listen what I have learned in the battle of the South Pacific." In his Boeing B-17 Flying Fortress, nicknamed "The Swoose," Brett claims a new Australia-United States flight record of 36 hours and 10 minutes which exceeds the time made by Sir Charles Kingsford-Smith several years ago. Flying the giant bomber on the trip was Major Frank Kurtz, former

U. S. national junior flying champ and holder of several distance records in his own right.

Correspondent Edgar Snow stated recently that during a single trip at the height of the Burma evacuation, during which hundreds of persons were flown out in time to save their lives, a Douglas DC-3, piloted by Lieutenant Sartz, carried 74 people and their baggage "setting up a record load for a plane of the type." Queried on the point, Douglas engineers said: "That would be putting it mildly!" A quiet resume of the weights and loadings of the famed DC-3 produced the following: Allowing a very conservative 150 pounds for each passenger and baggage, that would mean that a total load of 11,100 pounds was lifted not including the weight of fuel and oil which, quite obviously, was carried. At an empty weight of 16,000 pounds, this would mean that something like 28,000 pounds was lifted into the air. Although this seems a little on the fantastic side from an engineering standpoint, no little doubt is expressed as to the physical possibility of crowding 74 persons and baggage into a cabin designed to carry only 21 at most. "It was a neat trick, IF they did it!" the engineers concluded.

Lieutenant A. T. Rice, of Alhambra, California has set some sort of all-time air-fighting record with his recent victories over two Jap Zero fighters in a single day over Kiska Harbor, Alaska. Although he thus becomes the first Aleutian pilot to down two Zeros in a single battle his most unique contribution to history is the fact that he downed the first Zero with four shells, and the second Zero with *one* shell. Reason: when he sighted the two Jap fighters he had only *five* shells left in his guns!

A congressional committee, conducting an investigation into so-called inferiorities of American aircraft, released the following figures for publication: 1. From February to September 20th of this year, U.S. warplanes shot down a total of 279 enemy airplanes in combat on all fronts with a loss of 114 Yank planes. 2. In August of this year: Bell Airacobra fighters destroyed 19 enemy planes in combat with a loss of only four; Curtiss P-40 fighters shot down 18 enemy airplanes with a loss of only two of themselves. 3. For the month of August, U.S. planes destroyed 75 enemy airplanes with a loss to themselves of 15 planes. 4. In the 30-day period between August 14th and September 14th of this year the ratio of enemy planes destroyed in combat to our own losses was 7.5-to-1, highest in any of the world's major air forces. Bell P-39 fighters shot down 20 enemy planes with a loss of five, and Curtiss P-40 fighters shot down 14 enemy planes with a loss of only one.

According to Major-General Harold L. George the U. S. Army Air Transport Command today is operating the biggest airline in the entire world, or ever in history. "It is bigger than the combined airlines of the world prior to the war," he states. Speaking of the exploits of his command, General George stated: "When General MacArthur needed certain supplies for vital operations we got them to him in Australia in two and a half days." George also added: "We have had planes leave Miami and be ready for use in Cairo in less than three days!"

The layman need not be alarmed at the frequency with which he is presented with headlines dealing with crashes of our Army planes throughout the country, according to Robert A. Lovett, Assistant Secretary of War for Air. In a letter to Congress recently made public, Lovett stated that the rate of Army plane crashes in proportion to total hours flown was lower in 1942 than in the entire ten-year peace-time period between 1930 and 1940. During the first seven months of this year the accident rate (on a basis of 1000 hours flown) was 15% lower than the 1930-40 period. And this in spite of the fact that 45% more hours were flown during this seven-month period than during the *entire* ten-year 1930-40 period.

One of the most unusual and spectacular air-battle stories to come out of this war so far deals with a running fight between an American Boeing B-17 Flying Fortress and an equally huge Japanese Kawanishi Navy Type 94 flyingboat. Captain Walter Lucas of the Army Air Forces tells: "We sighted the Jap off to our side going in the opposite direction and up around 8,000 feet. I climbed up to meet him and the boys let go with everything they had. The Japs opened up, too, and I began dodging their turret guns. We swung back and forth over and under one another giving broadsides. After a while we silenced his side guns and the No. 4 engine. Then we hit two more engines which caught fire. The Jap swung down, landed in the water and started taxiing for a small island nearby. I flew low across him giving our tail gunner, Technical Sergeant Edward Spetch, a swell shot. He opened up and the Jap flyingboat exploded and sank." The battle lasted for 25 minutes, covered an area of 60 miles and more than 1500 rounds of .50 calibre ammunition were consumed with "at least half of them hits."

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According to Dr. Jerome C. Hunsaker, of Massachusetts Institute of Technology, any one of three developments in aeronautical engineering would immediately establish an air supremacy: 1. A successful gas turbine for airplanes, 2. a practical rocket plane, and 3. development of an airplane wing structure that would prevent the air from becoming turbulent as it flows over the wing surface.

Because lighted cabins would fog their vision and betray them to the enemy, warplane pilots must fly at night with their cockpits in total darkness. Yet they must be able to read their instruments or they are helpless. To solve this problem, "black light" is being utilized. Instrument dials are painted with fluorescent radio-active paint and under the invisible ultra-violet light rays of the "black light" beams, the dials stand out clearly as they do by daylight. Many colors can also be used.

To expand research in aviation medicine at the request of the Navy, the United States Health Service is building a new laboratory which, under the direction of Surgeon General Thomas Parran, will house the manifold projects of many of the nation's leading medical research doctors.

A survey by the Aeronautical Chamber of Commerce reveals that a total of 39,000 women are now engaged in aircraft production and this is only a start. The number of women actually employed in the industry, the chamber says, has increased 1952 percent since October, 1941. In addition to these production line women, there are thousands more doing routine clerical jobs throughout the industry and latest estimates place these at 7,200.

A plant making equipment for airplane manufacturers or other national defense work may continue its noisy day-and-night business and residents in the neighborhood will either get used to it or go without their sleep, says a ruling by a New York City court. Many complaints have been filed throughout the country against small, subcontractors operating in converted basements and garages by neighbors and until the above decision was handed down by Magistrate Raphael Koenig, no precedent was available. From now on it's full speed ahead. . . .

A new bomber turret which greatly increases the fire power of airplanes on which it is installed was demonstrated recently by the Briggs Manufacturing Company in Detroit, Michigan. The invention is described as a "locally controlled ball turret" operated electrically and under complete control of the occupant. It can revolve completely on its vertical axis and can be rocked back and forth through an arc of 60 degrees enabling the gunner to cover his entire field of vision. Already in production, the turret was described by military men as superior to any they had inspected. British, Russian and American military officers concurred on this verdict.

Drawing the knot even tighter, the Army has just issued orders for requisition of 25 more transport planes from major airlines. The War Department states that care has been and will continue to be taken to ask planes only from lines and routes where removal of equipment would cause the least possible disruption in air travel important to the war effort.

Final perfection of Air Corps night photography technic was recently announced with the exposing of a perfect picture on a moonless night from 8,000 feet which revealed footprints in a cornfield! The process, requiring from 40 to 100 pounds of super-flashlight powder, consists of firing off a giant bomb which illuminates the surrounding area "brighter than broad daylight," works in admirably with ordinary bombing in that the flash powder is loaded in a conventional demolition or shrapnel bomb which, upon exploding, permits a photograph to be taken. The enemy thinks he is only being bombarded but a roll of film 75 feet long containing 110 7x9 exposures is being run off. Lieut. Colonel George W. Goddard invented the process and has worked on it for 15 years.

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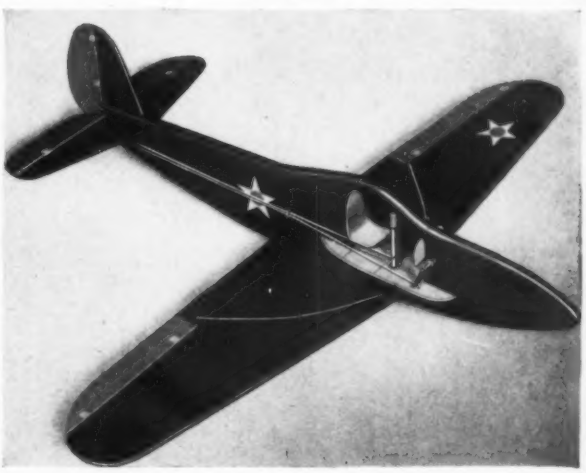

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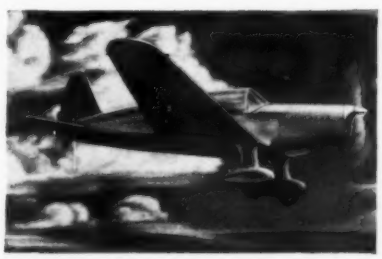

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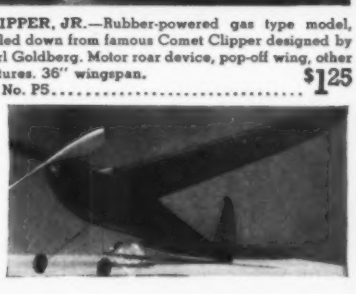

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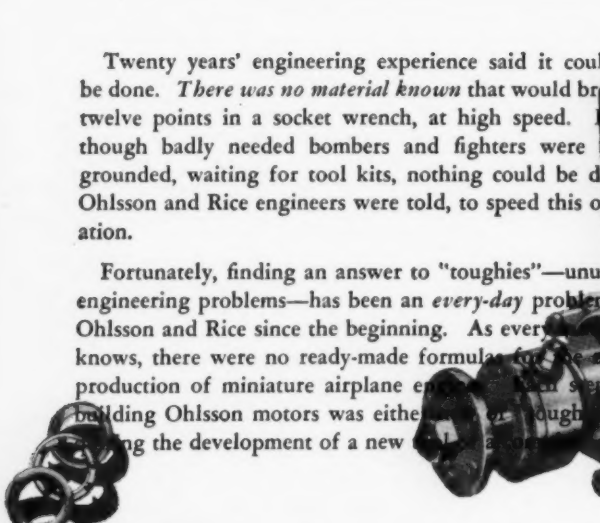

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